

CONVIVIAL MAKING:
POWER IN PUBLIC LIBRARY CREATIVE PLACES

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ABSTRACT

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Under the Supervision of Professor Joyce M. Latham

In 2011, public libraries began to provide access to collaborative creative places, frequently called “makerspaces.” The professional literature portrays these as beneficial for communities and individuals through their support of creativity, innovation, learning, and access to high-tech tools such as 3D printers. As in longstanding “library faith” narratives, which pin the library’s existence to widely held values, makerspace rhetoric describes access to tools and skills as instrumental for a stronger economy or democracy, social justice, and/or individual happiness. The rhetoric generally frames these places as empowering. Yet the concept of power has been neither well-theorized within the library makerspace literature nor explored in previous studies. This study fills the gap between the rhetoric and the reality of power, as described by the stakeholders, including staff, trustees, and users of the library.

Potentially, library creative places could be what Ivan Illich calls *convivial tools*: tools that manifest social relations involving equitable distributions of power and decision-making. A convivial tool ensures that users may decide to which end they would like to apply the tool, and thus are constitutive of human capabilities and social justice. However, the characterization of library makerspaces in the literature evokes a technologically deterministic entrepreneurialism that marginalizes many types of making, and reduces the power of individuals to choose the ends to which they put this tool.

This multi-site ethnographic study seeks to unravel the currents of power within three public library creative places. Through participant observation, document analysis, and interviews, the study traces the mechanisms and processes by which power is distributed, as

enacted by institutional practices—the spaces, policies, tools, and programs—or through individual practices. The study finds seven key tensions that coalesce around the concept of conviviality, and also reveals seven capabilities of convivial tools that the users and providers of these spaces identify as crucial to their successful and satisfying implementation.

As a user-centered exploration of the interactions of power in a public institution, this study can benefit a range of organizations that aim to further inclusion, equity, and social justice.

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To all those who know
what the misheard term
“bless the bees”
means.

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Preface

I like to tell this story, but my mother does not recall it in the same way. It remains indelible in my mind—a dream, a “true” memory, or a manufactured mythology, but one I have carried with me for so long I cannot remember its inception. I was sitting on the floor alongside my mother, who was creating clothing. She had carved a linoleum block with a stylized flower, pressed it into thick black ink, and lifted the block to set it on a gauzy red skirt. She pressed a band of blockprinted flowers along the hem of the skirt until only a small section of the hem remained bare. As she pressed one of the final prints onto the skirt, a drop of ink spattered from the block onto the surface of the skirt, well above the decorative borderline. Without breaking stride, my mother lifted a brush, swiftly drew on wings and a swirling dotted line indicating a flight path. The mistake became a bee. In my memory (but not hers) people complimented her on the bee whenever she wore the skirt.

My mother is a maker of things. She is a musician, a painter/calligrapher, a woodworker, a DIY rehabber, a crabber-together-of-oddments-to-create-what-was-needed. There was never a time in my life in which I did not hear the phrase, “I can make that.” It became my own motto by default. I was raised by this maker and my father, who was a maker of music and laughter. We were a white working-class Midwestern family with Bostonian connections. This was the 1970s, a communal, creative, anti-establishment era. For years, I was the only child in a community of musicians, all of whom made things.

When my parents split up, I travelled between households in New England and the Midwest, sometimes with my sister, sometimes alone. I read thousands of books, spent hours in libraries, and made things. Through my own childhood and then adulthood, and my children’s childhood and adulthood, I made things. Birth announcement calligraphies, curtains, renovated homes, food, socks and skirts and sweaters, furniture, gardens, educations, costumes, parties, toys, art, stories...I made all these things with my own hands, for a variety of reasons. I clambered on the shoulders of many giants to create these things, often using borrowed library materials to learn how.

When I became a librarian, I shared my interest in making with others, which grew into a series of programs and workshops for my libraries, and others' libraries, and I helped to develop a community-interest-based makerspace in the library where I was a director. When I became a scholar, I remained interested in the making of things. My study of power in public library creative places stemmed from my own interest in making and sharing making with others, the hundreds of reasons why making is pursued, and what seemed like oddly limited dialogue about the practice of making in some descriptions of library makerspaces.

I wondered, does everyone want life to be filled with "bees," in which one's mistakes are the best part, the things of which to be proudest? "Look at my facile improvisation and accommodation of calamity," these bees say. "Look at the Navajo spirit line breaking the perfect pattern, allowing a path toward grace." Does everyone want an environment which allows them to express their own bees in the way they see fit? This work is thus situated in the context of a life of making, because it emanates from questions I asked while engaged with my own making. It is the work of a white queer woman with working-class roots and an extensive education, who now inhabits a middle-class life in academia. It emerges from someone who understands her *own* making as praxis, and as the embodiment of an examined life: of joy, of learning, of connecting, of resurrection, of resistance, of frugality, of not-having-enough-otherwise, of self-expression, of social commentary, of making do, of making sense.

As it turns out, some people are distinctly *uninterested* in such things. Their making is situated in different contexts. Some are not delighted by the failures, remarkable or otherwise, that attend making. Some are not interested in social commentary, resistance, frugality. Some are. The people and cases described in the next pages have myriad, distinct ways of understanding making and reasons for making. All of them are valid. All of them seek power to attain the goals and outcomes they deem important. All are reported as transparently as possible, with the intention of understanding an everyday activity that is happening in and around public libraries across the country.

To best understand the stories of people using public library creative places, why they

make what they make, and how the institutions they are using help them serve the ends they value, I selected three diverse cases to examine, spent several months using those spaces daily, and spoke with over a hundred active participants in the study. I ate gourmet hot dogs in the Southern/Midwestern city, fresh beignets in the Upper Midwest suburb/city, and drank local wine in the rural areas of the Northeast. I made things, from electronics to sweaters. I used the tools and the spaces, and spoke with the other users and the people who make the spaces possible. I spoke with people who would never consider using the library for anything, those who fund the spaces, and those who think the spaces are a waste of resources, or are going to solve all sorts of social ills. Through all of this, I learned some of the complicated and intertwined stories of the public libraries and the communities that support them. There are “bees” all through these stories—serendipities and accidents, mistakes that end up being the best part.

Chapter One: Introduction

Public library creative places, often called makerspaces, are a relatively new phenomenon with historical roots. From craft-filled storytimes, knitting and quilting clubs, and technology workshops, a host of public library programs, services, and spaces have evolved to enable shared, social, creative activities and spaces. The concept and provision of these makerspaces—which are participatory social and spatial arrangements aimed, at least in part, at creating physical or digital objects through sharing tools, resources, ideas, and knowledge—has evolved rapidly from a service theorized by a few librarians and makers, to a widespread phenomenon, since 2011 (Burke, 2014; O'Duinn, 2009; Torrone, 2011).

When people join to build a social system, such as a public library makerspace, they tell themselves and others stories of why this system should exist and what it does for the people they are serving. This story is an *imaginaire* (Code, 2006; Flichy, 2007). Such stories reveal the assumptions, values, hopes of the creators: the ideas to which they jointly assign power and legitimacy. They reveal why some community funds, implements, maintains, and uses social systems. In public libraries, these imaginaires are often labeled the “library faith” (e.g. Coleman, 2008; Leigh, 1950; Molz, 1994). The reasons or ends that public library makerspaces serve, and the means by which they are assumed to attain those ends, are visible in the library faith *imaginaire*.

The reasons for implementing such spaces and services are varied. Different ideologies emerge from the voices of scholars, practitioners, funders, users and non-users of the spaces and public libraries. In the case of public libraries and makerspaces within them, the library faith is the *imaginaire* that maps the values these services and institutions hold, onto the actions they anticipate doing, for the outcomes they hope to enable. Alongside library faith imaginaires, the reasons for public library creative places also emanate from larger discussions of making and “The Maker Movement.” The Maker Movement is a recent phenomenon emerging from Do-It-Yourself (DIY) culture and from the inception of Make Magazine in 2005 and Maker Faires in

2006, and earlier manifestations of hackerspaces and hacklabs in Europe and the United States (Gorbatai & Dioun, 2014; Maxigas, 2012; Papavlasopoulou et al., 2017; Sivek, 2011). In the Maker Movement, spaces, communities and practices “enable all kind of users, including hobbyists, engineers, hackers, artists, and students, to express themselves by designing and building digital or tangible objects” (Papavlasopoulou et al., 2017, p. 58). This movement has its own discourse or imaginaire, which has been laid atop longstanding library faith narratives such as the importance of free and equitable access. For example, the American Library Association’s (ALA) press release supporting the phenomenon of makerspaces in libraries states:

Makerspaces in libraries allow everyone to develop critical thinking and problem solving skills; they facilitate opportunities for collaboration and community engagement that will aid in entrepreneurial thinking as well as the next generation of STEM jobs. They provide access to tools (from books to 3D printers) and, most importantly, “access to each other.” Library makerspaces are powerful informal learning spaces that give local community members the ability to create, hack, and make their future. (ALA, 2014)

This imaginaire centers on learning, Science, Technology, Engineering and Math (STEM) skills, and jobs.

One of the primary imaginaires centering on makerspaces and the practice of making outside of libraries (e.g. Ames & Rosner, 2014; Grimme et al., 2014; Tanenbaum et al., 2013; Toombs et al., 2015), and in public library spaces specifically, is that they are *empowering* to individuals and/or communities, especially those who are in some way socioeconomically marginalized, through the collaborative and constructivist process of making (e.g. ALA, 2014; Brady et al., 2014; Garcia et al., 2014; Greene, 2021; Hartnett, 2016; IMLS, n.d.-b; Meyer & Fourie, 2015; Willett, 2016). A preliminary analysis of the tropes embedded within the public library makerspace literature found a heavy reliance on this theme of empowerment, and if narratives noted the means of empowerment, they generally described it in terms of access to advanced technological tools, entrepreneurial innovation, and scientific knowledge.

The regular invocation of the word *empowering* inspired this project. As I considered it, questions emerged: Who is doing what to whom when this verb is mentioned? Who starts with

the power, and if they are willing to share it, are they also willing to stymie it? What sorts of power are included, and to accomplish what ends? Is the power understood as such by all the stakeholders? And as a verb, this word suggests a process by which empowerment occurs. How does that process work? What are the activities and enactments that facilitate power, or block it, and for whom? These questions are similar to those posed by one of the preeminent power theorists, Michel Foucault (1980), when he discussed how power must be explored: “If power is exercised, what sort of exercise does it involve? In what does it consist? What is its mechanism?” (p. 89).

Foucault (1977) focuses upon the social structures of power and how they provide “docile bodies” (p. 135), and my focus here is about the structures as well as the individual expressions of power. Yet my musings about empowerment, and the resulting survey of the concept of power, structured a theoretical framework that helped to guide this study. Thus, in this study, I am using the simplest definition of power, as practice theorist Anthony Giddens (1984) defines it: “the capacity to achieve desired and intended outcomes...power is not itself a resource. Resources are media through which power is exercised” (p. 15-16). Giddens differentiates his understanding of power from thinkers such as Foucault, saying it is not merely a property of social structures, but is instead a process negotiated through a dialectic in which the individual and social systems inform one another. Power is a verb, found in enactments and expressions. I also use the term *agency* as Giddens defines it: “Agency refers not to the intentions people have in doing things but to their capability of doing those things in the first place (which is why agency implies power)” (p. 9). This definition of power was chosen on the basis of its flexibility and compatibility with the convivial tool theory framing this study, the practice theory-informed methodology of the study, and the potential significance of this research, which is grounded in the capability approach to social justice.

As in longstanding “library faith” arguments, which pin libraries’ existence to social values, the rhetoric in the public library makerspace literature often describes access to particular tools or skills as instrumental for a stronger economy or democracy, social justice, and/or

individual happiness and economic well-being. As the literature review in Chapter Three will demonstrate, power and empowerment are keystones in the imaginaire grounding public library makerspaces. Yet research has barely begun to establish how these spaces impact their users or communities. Therefore, this study investigates some of these claims, focusing on those issues of power. As Marshall and Melo (2020) point out in their chapter on library makerspaces, “From Needs Analysis to Power Analysis,” often the stories librarians and scholars tell themselves about these spaces derives from what we think people need—specifically the diverse audiences for these spaces—to what power is shared or expressed within them. Marshall and Melo then go on to list 70 questions about power in these spaces. This dissertation addresses nearly all of them.

I am studying the discourses and practices of power surrounding creative places in public libraries, because I want to find how people think and make decisions when interacting with the library, tools, and community in these spaces, so that the reader understands how these creative places in public libraries impact their users' perceptions and processes of power. Therefore, this study asks if any conflicts exist between the goals of the library as an institution, and users' goals. It asks whether these conflicts may restrict user power in ways that are either antithetical to the needs of the users, their communities, to social justice, or to foundational library policy such as the Library Bill of Rights (ALA, 1996).

To focus the study using one of the many theories of power, it asks if these spaces can be considered what Ivan Illich (1973) calls “convivial tools,” or tools that ensure social justice by forwarding the power to decide how, when and for which purposes a tool is used to the user. In examining public library creative places as convivial tools, this study explores which processes of power facilitate or stymie the users' ability to make these decisions. In choosing Illich's (1973) theory of convivial tools to reframe the often under-theorized concept of *empowerment*, the study seeks to identify how and if these spaces are meeting the needs of the users, as defined by the users.

A Brief Overview of Public Library Creative Places

In this study I am focusing upon those creative places that are open for the free use of all library patrons, irrespective of the types of workshops, tools, staffing, materials created, or location. Such spaces might take many forms, including media labs, kitchens, art studios, crafting workshops, or some combination thereof. In libraries, they are most often called makerspaces or learning labs.

The Fab Lab (FabLab) at the Fayetteville New York public library is cited as the “first” library makerspace (e.g. Good, 2013; McCue, 2011; Wang et al., 2016). It was, at least, the first space that both claimed the label of makerspace and also garnered nationwide attention, in mid-2011. Three other large public libraries followed suit within the year: The Allen County Indiana library created a partnership with private company TekVenture in a trailer in their parking lot (Newcombe & Belbin, 2012); Westport Connecticut’s library started their makerspace in the center of the library; and The Idea Box began in Oak Park Illinois’ library, as a small glassed-in room in which patrons are invited to paint, draw, write, and play (Benton et al., 2013). By 2013, many libraries were applying for IMLS grants focused on makerspaces and STEM learning (IMLS, 2012a), creating either permanent makerspaces or pop-up spaces, and the idea of these creative places gained traction in the nation’s libraries (Britton, 2012b; Burke, 2014; Dixon et al., 2014).

Makerspaces often center on tools of digital production. These include 3D printers, laser cutters, and other computer-numerical-control (CNC) equipment. Such tools allow those unskilled in traditional sculpture, woodworking, or machining skills to create objects from computer code. These tools replace or augment artisanal skill with computer literacies. This is often described as “democratizing” making (e.g. Blikstein, 2013; Bull & Groves, 2009; Sangüesa, 2013; Seravalli, 2011; Tanenbaum et al., 2013; Wapner, 2015). However, while these types of tools are the ones most often invoked in relation to makerspaces (e.g. “Hackerspace,” 2022), most spaces include older technologies, art and craft materials and tools. Sewing machines are common, as are hand tools, fiber arts materials, and jewelry making supplies. Electronics

equipment and robotics are also common (Bagley, 2014; Fleming, 2015; Hlubinka et al., 2013; Kemp, 2013; Kurti et al., 2014). The spaces are constructed and populated in ways intended to inspire creation (Dunford, 2015; Gierdowski et al., 2015; Kurti et al., 2014), as well as learning (Bilandzic, 2013; Egbert, 2016; IMLS, 2014a; Litts, 2014; Papavlasopoulou et al., 2017; Schrock, 2014; Sheridan et al., 2014). In addition, they are often considered empowering through processes such as learning, access to expensive tools, creating alternative discourses and media, forming new relationships to material culture, and/or through participatory social connections (Barrie et al., 2021; Diaz et al., 2021; Greene, 2010; Nascimento, 2014; Nicholson, 2019; Prato & Britton, 2015).

Some librarians and library scholars consider these spaces new or qualitatively different from earlier library practices (e.g. Apodaca, 2017; Brady et al., 2014; Di Marino & Lapintie, 2015; Moorefield-Lang, 2015a; Slatter & Howard, 2013). Lauren Britton (2012a), the creator of the “first” public library makerspace in Fayetteville, said that “We are doing something that has never been done before.” However, predecessor practices in libraries include the provision of hobby clubs, pianos for community members to play, and computer, art, craft, and gaming events (Bostwick, 1910; Moyer, 2012; Rappaport, 1985; Wiegand, 2015a, 2015b). These other versions of what one could label “library makerspaces” occur in multiuse library spaces, such as meeting rooms. Librarians offer these services as programs, at set times, for set audiences, and often aimed at specific, planned projects. In contrast, many of the new makerspaces are in rooms or areas dedicated to object and content creation. They are often at-will spaces in which users may drop in and create whatever they like, whenever they like. They may exist instead of, or in addition to, a programming model of services (Britton, 2012a; Burke, 2014; Slatter & Howard, 2013). They may also leverage user-provided knowledge, alongside knowledge contained in books or other media (Halverson et al., 2017; Lui, 2016; Peltonen & Wickström, 2014).

As Skåland et al. (2020) point out, “The rationale for providing makerspaces in libraries is usually taken from either do-it-yourself ethics (DIY) or neoliberal ideologies of innovation and competition, or a combination of the two” (p. 158). While interest in public library makerspaces

took off in 2011 (Torrone, 2011), in 2014 that interest exploded further with the call of Barak Obama and other leaders to develop a “nation of makers” to launch businesses and create jobs, expand opportunities for making and STEM learning, and to challenge makers to innovate new products to solve national problems (White House, 2014). The Obama White house sponsored a Maker Faire showcasing made artifacts and their creators, and reported on the grants available from an array of federal agencies, including the Institute of Museum and Library Services (IMLS), and a variety of corporate partners. These grants were already being disseminated in the name of learning (IMLS, 2012a, 2012b, 2014b). The second point, as Skåland et al. (2020), Britton (2012b), and many other LIS scholars point out, is that DIY narratives of cultural change, addressing local problems, the need for creative outlets, and taking “ownership” of technology as a creator rather than a consumer, also drive the implementation of public library makerspaces.

The Research Problem and Method

My questions about the library faith imagine of “empowerment” informed this study’s methodology, which requires an in-depth understanding of diverse creative places and libraries, and the practices of the people who interact in them. This study examines the stories and experiences of a variety of stakeholders in three diverse public library creative places. It explores decisions made at the individual and institutional level. In doing so, it examines issues of power—who feels able to do what, and why they believe that to be the case. In addition, the study seeks to understand how these spaces are or might be convivial tools.

Creative places in public libraries have just started to be explored from a users’ perspective, and few studies have examined how the users perceive the spaces, what they are able to accomplish in them, or how power is enacted in these spaces. This literature began to develop in 2020 (e.g. Sanchez, 2020; Sherrill, 2020; Teasdale, 2020). Scholars are seeking more information about the processes of power in these spaces, agitating for power-centered research (Cirell, 2020; Marshall & Melo, 2020). This research, critical scholars state, needs to decenter a white male-centered notion of making (Brown, 2020; Melo, 2018; Nay, 2020). Therefore, the

purpose of this research is to help scholars and practitioners understand what these enactments of power are, and how they are expressed by institutional and individual actors.

This research explored the development, provision, and experiences of three public library creative places in three diverse communities in 2016. Using ethnographic methods of participant-observation, interview, and document analysis, the data provided an emerging grounded theory of the tensions of power between institutions and individuals, and the power capabilities sought by the stakeholders. The 115 participants in this study provided multiple perspectives on what these spaces were for, what activities they allowed and facilitated, and other discussions of power.

Using these methods allows me to scrutinize enactments and descriptions of power in public library makerspaces, including the individual user's capabilities in working in the space, and the library's organizational strategies in providing it. This is important because it can help scholars and practitioners understand the role of libraries in facilitating social justice and sharing power to accomplish their users' goals and to benefit communities in ways meaningful to them. Practically speaking, it can help libraries plan spaces, programs, policies and practices that will equitably support their users' actual needs and wants. However, this is data from 2016, and shifts may have occurred in the practices in these spaces since then.

Research Hypothesis and Research Questions

This study is based upon the hypothesis that institutional discourses and practices of power around these places shape the capabilities and power of the users of library makerspaces, potentially in convivial ways. The hypothesis assumes that the users enact power as well. They also shape the capabilities of the library and the other users, through their discourses and practices. This is a reciprocal co-creation of the tool of the library creative place. Such co-creation by individuals and institutions is at the root of practice theory, such as is espoused by Anthony Giddens (1984). In this understanding of how agency, or individual power, and structure, or organized social power, are enacted, the individuals and institutions interact to shape the

affordances and uses of an institutional tool.

In public library creative places, these institutional and individual discourses and practices shape the capabilities of people who do or do not use the spaces, those who fund the spaces, or the people who work in the library. They do this through a variety of factors, including decisions about governance, budgets, and policy, through the permissible interactions of people and tools, through spatial arrangements, and the reasons the institution gives for each of these decisions, or by individual behaviors and assumptions about the spaces.

Since this study seeks to understand how public library and user discourses and practices shape the conviviality of public library creative places for their stakeholders, the research questions are:

RQ1: What are the lived experiences of the stakeholders in public library creative places, specifically involving power?

RQ1a: What are the institutional discourses and practices involving power in these creative places?

RQ1b: What are the individual discourses and practices involving power in these creative places?

RQ2: How can convivial tool theory intersect with these discourses and practices?

In this study, I ask these questions as I look how people experience three library creative places. As I do so, Ivan Illich's (1973) concepts of "conviviality" and "convivial tools" are key to the formation of this study, its questions and its hypothesis.

A key point in examining the research questions is that I, the researcher, exist within them; I acted as a stakeholder in these spaces, practicing making alongside other community members. This embeddedness is significant, because as ethnographer Renate Rosaldo (1993) notes:

All interpretations are provisional; they are made by positioned subjects who are prepared to know certain things and not others. Even when knowledgeable, sensitive, fluent in the language, and able to move easily in an alien cultural world, good ethnographers still have their limits, and their analyses always are incomplete. (Kindle location 313)

Rosaldo goes on to point out that the “subjects” of study are also interrogating the ethnographer, and are neither entirely reliable in terms of any objective “truth,” nor experiencing their culture within an unchanging vacuum. This is why the research questions highlight lived experience as it is expressed through discourse and practice in these spaces. The experiences of the participants in this study, including my own, are interpreted here provisionally, through a specific lens, using specific cultural understandings and theoretical frameworks. To ensure that my interpretations were aligning with the participants’ I used member-checking techniques including sharing early drafts of the findings with the people at the field sites, and uploading them to a website that I shared with participants when they signed the consent forms.

The Theoretical Framework

There are many ways to understand or frame the concept of power and its processes. From Foucault’s (1977) discussion of institutional discipline, to Giddens’s (1984) description of power as a process manifesting through both individual and institutional actors, to Lukes’ (2005) descriptions of how power is enacted through control over decision-making processes, each theory of power has something to offer to this study—and they did, with sensitizing concepts embedded in the semi-structured interview questions. However, from these many theories of power, I chose to focus on the power relationship inherent in Ivan Illich’s (1973) concept of the “convivial tool.” A convivial tool is one which embodies a power relationship within its affordances, wherein the designers or facilitators of the tool cede power to the tools’ users, so the users may decide how, why, when and where they use the tool.

This power relationship was chosen from the array of theoretical frameworks because it spotlights the one relationship that is most commonly associated with makerspaces, in and outside of public libraries: the user-centered ability to choose how and why to use a makerspace. For example, in their exploration of makerspaces and the concept of empowerment in non-library makerspaces, Grimme et al. (2014) linked a version of conviviality to the concept of empowerment by stating that “One of the most basic ways that [the users of the makerspace]

empowered themselves was by giving themselves products or services that they wanted or needed.” (p. 434). Moreover, Illich is regularly invoked in light of makerspaces and making processes, as they are assumed to “deschool” society, in assisting people in breaking free from institutionalized education to embrace a personal and liberatory path toward learning (e.g. Gauntlett, 2018; Grimme et al., 2014; Kostakis & Pantazis, 2021; Lui, 2016; Toombs et al., 2014; Willett, 2016).

Discussion of the power to do what one wants with the tools and communities in these spaces is visible in many explorations of non-library spaces, even when Illich is not cited (e.g. Alfaro, 2013; Dousay, 2017; Litts, 2014; Tanenbaum et al., 2013; Wyld, 2015). This discussion of empowerment stems from the founder of Make Magazine, Dale Dougherty, who said “Makers are in control. That's what fascinates them. That's why they do what they do. They want to figure out how things work; they want to get access to it; and they want to control it. They want to use it to their own purpose.” Nascimento and Pólvara (2018) explored this rhetoric of control and power, by explaining the maker imaginaire’s evocation of *empowerment* through the access, skills, and decision-making power to create as individuals choose:

...the maker movement appears as a social collective strongly oriented towards the values of technical creativity and self-expression, openness and knowledge sharing, community building, and alternative innovation ... Their public message is that anyone can and should have access to tools and communities to build or rebuild anything they might want or need, standing out as a self-empowering vision of present worlds where consumers should have all necessary skills to become producers or creators. (p. 930)

In these descriptions of empowerment, the empowerment is self-initiated, and possible through access to the tools, skills, and communities of making. The key point is that these tools, skills, and communities—in total, an institutional tool called a makerspace—are said to comprise a convivial tool allowing users to do as they choose.

Similar power processes and dynamics have been assumed in the public library literature (Li & Todd, 2016b). The phrase “whatever captures their fancy” (Doctorow, 2013; Samtani, 2013), or similar phrases, are used to describe what people may do in library creative places. The

empowerment in these spaces is assumed to derive from the conviviality of the tool, though only Willett (2016) and Lui (2016) mention Illich's theory in this context, in passing. Yet the imaginaire described in the library literature settles on the idea that these makerspaces will allow users to use the library to accomplish whatever goals they deem important. They are said to be a convivial tool that the library institution and professionals are designing and offering to accommodate user needs, whatever those needs might be. For example, making is presumed to help "learners construct their own meaning of self and community, and contribute to those meanings, becoming empowered through the process" (Egbert, 2016, p. 33). No one has previously asked the makers in libraries if this is true for them.

Since conviviality is a power relationship commonly described in the Library and Information (LIS) and non-LIS literatures regarding makerspaces, even if that term is rarely invoked, the convivial tool relationship is the one explored here. Chapter Two more fully explores the concept of conviviality and convivial tools. This study will then go on to explore how or when public library creative places embody the power relationship known as "conviviality" for their users, for their communities, and even for the library itself.

Key Definitions

I have already defined public library creative places, power/agency, and convivial tools, but several other terms need clarification to unpack what, precisely, the research is seeking to understand.

- **Institution:** In this project, the institution to which I refer is, unless otherwise noted, either the collective United States public library system, or an individual instance of a U.S. public library. The institution is embodied and organized through the collective decisions and goals that encompass its organization. The institutional practices I will discuss are those constituted by the personnel and trustees of public libraries when they exert power in their capacity as agents of the institution.
- **Practice:** Actions, tasks, and situations involving shared beliefs, routines, and rules

(structure), but which are also emergent and evolving by virtue of individual choices—intentional or otherwise—to reproduce or amend the existing structure. Practice theorists such as Schatzki (2001) say practice is both embodied and discursive in nature, but in this dissertation, I use the term *practice* to describe the participants’ observed “doings” or embodied actions, sometimes unaccompanied by speech, to distinguish from the “sayings” or discourses they enact. The experiences of stakeholders in these spaces are visible in their practices.

- Discourse: I use the term *discourse* to describe the “sayings” or speech acts by the participants. The experiences of stakeholders in these spaces are described and contextualized by them through their discourses.
- Stakeholders: Anyone with an interest in the workings, uses, or outcomes of public library makerspaces. This set of people includes users and non-users of the library and/or creative place, library staff and administration, governmental agencies and library partners and funders, trustees, and the communities they serve. In other words, stakeholders include any individuals involved in the community.

Significance of this Problem and this Research

As the literature review and findings will demonstrate, the research problem is significant because creative places are popping up in libraries across the country and around the world, and we have little understanding of how they function or how they impact their users. This study investigates whether public library makerspaces have the potential to be convivial tools, to help individuals and communities to flourish in ways that are valuable to them. This is significant not only because user empowerment is generally a stated goal of these services, but from the institutional perspective, it is unknown whether libraries should spend their resources on providing these spaces and services, if they are not impacting users as expected, given limited and often shrinking pools of resources. The process(es) by which any empowerment occurs, and for whom, has implications for marginalized communities.

Moreover, this study asserts that Illich's concept of "conviviality" can offer a new perspective on library narratives, and offers a framework for convivial policy and practice in these spaces, and, potentially, for other information services. The concept of conviviality aligns with foundational tenets of librarianship found in the Freedom to Read and Library Bill of Rights policies. For example, librarians are exhorted not to "coerce the taste of others," and to avoid "foster[ing] education by imposing as mentors the patterns of their own thought" (ALA, 2004). They are told that "library resources should be provided for the interest, information, and enlightenment of all people of the community the library serves" (ALA, 1996). These library policy statements encourage librarians and libraries to ensure that their community members have decision-making power over how to use the library as a tool to meet their own needs with minimal barriers imposed by the institutional actors. These documents situate the public library as a convivial tool.

Ivan Illich (1973) agreed, labeling public libraries as a prototype for convivial tools (p. 79). In their ideal form, he stated, public libraries do not force a standard discourse upon their users, nor mandate their use. Instead, they allow users to choose when, how, and for what purpose they use the library; they are simple to use; and they exist within a structure of mutual interdependence. This meets every criterion for a convivial tool. Yet Illich did not define *how* a tool is convivial in practice, nor the decision-making processes that encourage conviviality. Instead, he said he did not wish to write "an engineering manual for the design of convivial institutions or tools" (p. 27). Yet such a manual could be useful for these institutions and the designers or facilitators of the tools. This study begins structuring such an "engineering manual" based on the findings in three diverse public library creative places.

Convivial tool theory is a critical theory that interrogates the relationships individuals and communities have with the tools they use. More broadly, critical theory is valuable in examining the underpinnings of power and control within public institutions such as libraries (Leckie et al., 2010). Media and Internet scholar Siva Vaidhyanathan (2006) goes further and calls for a field of Critical Information Studies, which includes an examination of the political

economy and cultural effects of libraries. This dissertation is intended to situate the case of public library creative places within this transdisciplinary field of study. It offers Illich's theoretical framework to expand as a useful heuristic in Critical Information Studies. In a similar vein, Illich (1973) called for a new type of research to further the understanding of convivial tools and to place social limitations on non-convivial ones. Instead of research aimed at developing new methods of consumption or to preserve humans for increased consumption, he called for *counterfoil research*, which "must clarify and dramatize the relationship of people to their tools... to hold constantly before the public the resources that are available and the consequences of their use in various ways." (p. 83). This study is offered as such critical, counterfoil research.

Each of these reasons for pursuing this research aims at larger goal: social justice in and through public libraries. I look to the capability approach to social justice in this study (Nussbaum, 2011; Sen, 2009). I define a socially-just library as one in which policies and practices equitably support people's capabilities, and which balances individual needs with the needs of the entire community or society over time, in ways that support individual agency as much as possible without infringing on others' agency. This includes people's agency to use the library as they choose, which implies the continued existence of the institution. Thus a balancing act is required between individual agencies and the needs of the community as a whole. For example, individuals might wish to ban certain materials based on their own morality, but that forecloses others' opportunities to exercise their capabilities. This interdependence is a key factor in convivial tool theory.

The potential for public library creative places to affect communities extends far beyond the walls of the library. In facilitating individuals' and communities' capabilities and power, these spaces offer an opportunity unavailable anywhere else. Without the provision of such free and open spaces that the libraries provide, these opportunities are not available to all, due to the monetary and spatial burdens that are unsustainable for many, or lack of social support and knowledge. These opportunities are uniquely possible within a publicly-funded institution with a mandate for free, equitable services for all ages and a wide range of uses (ALA, 1996). The

equitable, access-based mandate and the potential for the expansion of capabilities of all members of a community, especially those underserved in other contexts, grounds this study's significance in the area of social justice.

Illich (1973) described polarization of those who do and do not have power when using tools, and how they have power (p. 80), as a social justice issue. As Illich stated, "Rationally designed convivial tools have become the basis for participatory justice" (p. 27). This study aims to illuminate any discrepancies of power among different groups using the library creative places, by offering concrete examples of these discrepancies. It offers an opportunity for the participants' voices to be heard, with some describing what the discrepancies mean to them. Some of these discrepancies highlight fissures in the open and equitable access mandate, and identify which community groups are being served or excluded in practice.

Thus there are theoretical and practical reasons for researching this problem. The details of how the three cases sought to ensure these spaces and associated library services were meeting the needs of the community, and the identification of the tensions and problems in such offerings, will assist practitioners. A more fully-elaborated model of conviviality theory is both practical—it could be used as a checklist or a touchstone for creating assessments for library and other information systems—and theoretical. The theoretical implications of developing convivial theory and understanding more about power practices in public libraries can offer a new tool to forward our understanding of public institutions and services in a social justice context.

Outline of the Study

In this introductory chapter I have defined the problem under consideration, the purpose of this study, and the research questions that address it. I defined the key terms for the study, and began to lay out the theoretical framework and the most relevant literature that guides it. In addition, I have laid out several lines of reasoning for the study's potential significance. This chapter is intended to set the stage for the rest of this project.

From here, I will develop the study further and provide its findings in further chapters. In

Chapter Two, I unpack Illich's theory of convivial tools, and survey the literature on convivial tool theory. Chapter Three will synthesize the empirical literature on public library creative places, other makerspaces, and making. In Chapter Four I outline my methodology. Including this chapter, these chapters define and situate the study.

A quick interlude orients the reader to the Findings chapters. This interlude describes how I will present these findings as a narrative, augmented with analytic text that highlights the shift between participant/maker and observer/analyst. Then four chapters detail the findings, one for each case and one analyzing the cases together and describing the model derived from the findings, and bridging some of the gaps in Illich's original work.

The concluding chapter will offer an overview of this research's findings, contextualize them in the larger literature, and propose directions for future study. This chapter will conclude with some practical and theoretical implications, and its limitations. This chapter provides an exploration of the claims, evidence, and conclusions of this research.

Conclusion

This study is intended to explore the use and perceptions of creative places in public libraries from the perspectives of all types of the stakeholders involved in designing, administering, staffing, partnering, funding, and using or not using them. It intends to demonstrate what individuals and communities are or are not able to accomplish through their use—their capabilities. The research does this through exploring the power relationship Ivan Illich calls “conviviality,” and through examining the discourses and practices in and around the spaces.

To this end, this study involves a multi-site comparative case study using ethnographic methods to explore issues of power within the spaces on a meso/institutional and micro/individual scale. Observing, participating, and asking about the individual perspectives of the users allowed me to explore perceptions of power in the library spaces, the mechanisms and processes by which power is distributed within these spaces, and any limits imposed on the users'

power by institutional choices, as well as the ways the institution decisions enable the distribution of power to the users. To do this, next I will explore the concepts and theory of the “convivial tool.”.

Chapter Two: An Orientation to Convivial Tools

In the early 1970s Ivan Illich, a radical Austrian philosopher-priest, professor, and public intellectual working in the United States, Puerto Rico, Mexico, and Germany to advance social justice, understood that many public institutions, communication tools, and the accoutrements of daily living were not making lives better (Samuel, 2013; Illich, 1973). When he turned his gaze to public schools, he saw instruments of coercion and control (Illich, 1971). He identified practices in the medical industry processes that put the needs of the people behind those of pharmaceutical companies (2000). He saw the sorts of bodily discipline described by Michel Foucault, in which institutional procedures acted as control mechanisms to strip patients of their agency, and furthermore caused iatrogenic harm to patients in the name of medicalization (Illich, 2000). He wrote on gender inequity as an intrinsic fact of developed economies that devalue female labor (Illich, 1983a), and of non-economic work done outside the capitalist system (Illich, 1981). He saw in most professions a disabling tendency to remove agency and capabilities from the common person, rendering them helpless unless lead (Illich, 1977). He was inspired by theorists such as Frankfurt School theorists like Horkheimer, Adorno and Marcuse, as well as Marx. Illich wrote of these jeremiads over the course of several books. He addressed the problems of the tools that were supposed to help people flourish, in a brief treatise entitled *Tools for Conviviality* (1973).

This research rests upon Illich's concept of convivial tools as the theoretical basis for the study. In this chapter, I will expand on the development, usage, and critique of this theory. In addition, I'll explore the key components of the concept of conviviality that other researchers have constructed.

Illich's Definition of Convivial Tools

Illich (1973) defines convivial tools as those that,
...foster conviviality to the extent to which they can be easily used, by anybody, as often or as seldom as desired, for the accomplishment of a purpose chosen by the user. The use of such tools by one person does not restrain another from using

them equally. They do not require previous certification of the user. Their existence does not impose any obligation to use them. They allow the user to express his meaning in action. (p. 35)

They are those tools that embody particular social and power relations within their affordances. They are created as a means to a human-sought end. The designers of these tools, or those institutions that act as tools, ensure conviviality to the extent that they further the capabilities and power of their users.

Illich (1973) details three main factors for a convivial tool. A convivial tool is one that is designed and maintained so that the power to choose what to do with it, how and when to do it, and the reasons for its use are forwarded to the user. This is the user-centered control Illich describes as necessary for conviviality (p. 12). The second factor of a convivial tool is that it allows for competence, or what he sometimes describes as “active master[y]” (p. 34). Finally, a convivial tool is one that allows for this competence and control not despite, but through, social interdependence. As Illich (1973) explains:

In an age of scientific technology, the convivial structure of tools is a necessity for survival in full justice which is both distributive and participatory. ... Rationally designed convivial tools have become the basis for participatory justice (p. 26).

The three factors of a convivial tool are necessary for such participatory social justice.

Control

The first thing Illich determines as necessary for a convivial relationship is the user’s ability to control the tool oneself. The decision-making affordances embedded in such a tool allows for user-centered power enactments. Instead of deciding the proper use of a tool, or limiting its use to particular outcomes, a convivial tool’s designer releases control of the tool to its user. It offers usability on the user’s terms, for reasons chosen by the user, and with minimal restrictions. The initiative on how, when, and why to use the tool is left in the hands of the user.

Illich (1973) describes how, as tools became more specialized and the knowledge to use them became professionalized, such as in the guild system in Europe (p. 16), the general population lost access to the tools and skills they could use to realize their own goals. To ensure

freedom and dignity, key factors for social justice, he states, requires the equitable distribution of “personal energy under personal control” (p. 25).

A convivial tool is simple, generally easy to use and requires little training to achieve the user’s aims, enabling an easy path to competence. It is controllable, and one can develop mastery in it through one’s own actions. Instead of requiring some type of institutionally-legitimated expertise, such a tool encourages “learning by primary experience” (Illich, 1973, p. 73). Illich believed a convivial tool involved minimal need for instruction. He stated that the more complex a tool is, the more programming and certification a person needs to use them, limiting the democratization or broad transferability of their use. He thought that a complex tool could exceed an individual’s or society’s capacity to control it. He favored simple human-centered tools: “As the power of machines increases, the role of persons more and more decreases to that of mere consumers” (p. 23).

Active Mastery

Illich sometimes describes the ease of using convivial tools as an ability to achieve an “active master[y]” (p. 34). Such mastery, he states, is opposed to a passive receptivity to whatever an institution wishes to inculcate:

An individual relates himself in action to his society through the use of tools that he actively masters, or by which he is passively acted upon. To the degree that he masters his tools, he can invest the world with his meaning; to the degree that he is mastered by his tools, the shape of the tool determines his own selfimage [*sic*].
(p. 34)

Illich’s concept of active mastery situates the user as the agent of his or her own destiny, whereas a non-convivial tool furthers institutional aims, potentially at the expense of the aims of the individual.

Interdependence

Finally, the use of a convivial tool is best achieved through power relationships of social interdependence (Illich, 1973, p. 24). Even the term itself, grounded in the Latin *con-vivium*, or

living together, implies that conviviality is not simply about individual needs or desires (Cabitza et al., 2015). Convivial tools do not further individual aims to the detriment of community needs, but balance the liberty and desires of the individual with the needs of the society in which the individuals are working. Illich considered conviviality “an intrinsic ethical value” (p. 24), due in part to this interrelatedness. A convivial tool acts through relational equity, thus facilitating a broad diversity of uses to accommodate a spectrum of users’ desires. This equity permits “individuals and transient associations to constantly recreate their mutual relationships and their environment with unenvisioned freedom and self-expression” (p. 47). Thus a convivial tool expresses a social relationship of user-centered power in which all individuals share equitably, do not infringe on one another’s freedom, and can act as mutual support in non-coercive, flexible relationships.

Interdependence requires “autonomous and creative intercourse among persons, and the intercourse of persons with their environment” (Illich, 1973, p. 24). Illich contrasts this with narratives and relationships embodying enhanced industrial productivity (p. 25), and efficiency (p. 33). As an example, he describes how tools that privilege individual speed over the common good has stratified society (p. 51). By prioritizing speed, he says, public transportation efforts are abandoned in favor of individual vehicle development and road construction, resulting in a culture of have and have-nots. This is one of the many examples Illich gives to describe how the awareness and support of interdependence is necessary for convivial power relationships.

The Signs and Consequences of Non-Convivial Tools

If a convivial tool is created as a means to a human-sought end, what happens when the tools become ends in themselves? Illich (1973) decried tools that were once imagined as convivial (like schools) but that became ends in themselves. He lays out five imbalances of power, in which the non-convivial tools embedded within our culture develop. These non-convivial tools signal that we are headed down an unjust, and harmful, pathway: through biological degradation, radical monopoly, overprogramming, polarization, and obsolescence. I will focus on the latter

four of these imbalances here. Biological degradation, while of deep concern to some makers and librarians, is rarely the focus of their efforts, at least in the culture of the three public library creative places under investigation in this study. Illich goes on to describe a widespread social frustration due to these imbalances and the predominantly non-convivial tools that are the social norm.

Radical Monopoly

Radical monopolies involve an imbalance of what people do themselves, and what they rely on institutions or organizations to provide for them. Illich was writing at a time in which do-it-yourself rhetorics were spawning or reviving movements toward self-actualization, including homeschooling, back-to-the-land small-scale farming, utopian communal living, and personal computing (Gauntlett, 2018; Wehr, 2012). He captured this zeitgeist in his description of radical monopolies.

Any tool that requires compulsory use involves a radical monopoly, and embodies “a special kind of social control because it is enforced by means of the imposed consumption of a standard product that only large institutions can provide” (p. 65). Of particular relevance to this study, Illich (1973) challenges schools as a primary example of a non-convivial institution of radical monopoly. A radical monopoly occurs not only when the apparent effectiveness of a particular tool or institution forecloses use of any other tool, but often it even forecloses a discussion of whether the tool is effective or necessary. Schools, he argues, compromise a radical monopoly because other types of learning are unlikely to be considered by most. The entire educational system has become naturalized to the point where no other system of learning is widely comprehensible. The compulsory aspect of education is enforced by truancy laws, and more insidiously through policies and structures that require educational certifications to attain further goals or to do particular work, even when those certifications are not strictly necessary. Illich believes that radical monopolies can result in individuals and communities being shaped to the needs of the institution, rather the institutions meeting the needs of their users.

Illich leverages the concept of the radical monopoly in a larger critique of professions and professionalism. He claims that professions have assumed the privilege to prescribe solutions to needs shaped by professionals, for the purposes of self-sustaining power to authorize what is correct and moral, resulting in “operant conditioning of their clients” (p. 29). He goes on to suggest that these institutional values and conditionings have so permeated our culture that it is challenging to even see them as political choices (p. 33). Illich (1977) develops his argument surrounding professionalism further in his book *Disabling Professions*. There he points out that professions perform these authorization and legitimation functions to sustain the status quo of powerful elites (p. 17). Furthermore, he critiques the “professionalization of laymen” in the guise of self-help (p. 37). These arguments are relevant to the profession of librarianship, although they are somewhat reductive, ignoring the benefits and expertise that professionals do have to offer.

Overprogramming

Overprogramming occurs when tools and skills become more specialized and appear to require education to do even the things that could be learned through doing. Overprogramming is an upset in the balance of learning, away from individual control, in favor of institutional control. Illich calls this “programmed preparation for life in the future in the form of packaged, serial instructions produced by schools, or it can be constant communication about ongoing life through the output of the media and through the instructions built into consumer goods” (p. 59). Such overprogramming results in obsolescence, when people must re-skill themselves to be able to interact with a new type of machine or tool, “transform[ing] the world into a treatment ward in which people are constantly taught, socialized, normalized, tested, and reformed” (p. 76).

Illich (1973) rails against the power relationships inherent in teaching and being taught, rather than in learning through a self-directed process of exploration: “People who are hooked on teaching are conditioned to be customers for everything else. They see their own personal growth as an accumulation of institutional outputs, and prefer what institutions make over what they themselves can do” (p. 68). Furthermore, he decries the idea that educators shape the way in

which people must re-skill throughout their lives to meet the needs of industry (p. 76). He makes a political economy argument against overprogramming, stating that advanced technological systems under capitalism not only require formal educational systems to ensure people can use the advanced tools of production such economies need, but that this overprogramming also trains people to want or need such tools (p. 76). This is similar to Marcuse's (1991) argument about the one-dimensional man, in which "false consciousness has become embodied in the prevailing technical apparatus which in turn reproduces it" (p. 149).

While he sees value in teaching for which individuals take personal responsibility, or seek out to meet their own needs (rather than as a process of legitimization within a bureaucratic society requiring certification), Illich otherwise sees learning as something that must emerge from each individual rather than from top-down processes of social control. He argues that feasible learning models would "set up educational arrangements that favor self-initiated, self-chosen learning, and that relegate programmed teaching to limited, clearly specified occasions" (p. 61), the learning model that the makerspaces typically offer (e.g. Colegrove, 2017; Light et al., 2016; Sheridan et al., 2014; Toombs, 2016).

Polarization

As Illich (1973) lays out his arguments against non-convivial tools, he explores issues of privilege and power. Power is polarized when it is concentrated into the hands of the few with access to the power switches that can make tools or processes start and stop (p. 85). The gap between the wealthy and poor, and the "educated" and those who learn outside of school institutions, is not only non-convivial, says Illich, but it also splinters societies into stratified layers with little trust for one another. Illich speaks to the gap between the rich and poor as one aspect of this polarization, but also the ways in which technological tools privilege some groups while acting as a barrier to flourishing for other groups.

As he speaks of how the various technological and economic assets of a society are hoarded by the most-credentialed, he notes that "the alternative of greater happiness at lower

affluence is pushed into the blind spot of social vision” (p. 82). He claims that due to overprogramming and radical monopolies, even poor people who could learn on their own and value their own experiences, instead hew to institutional learning and institutional products, instead of things they create themselves. Moreover, this preference, he notes, is so naturalized in our culture that people are unaware that there could be any other way of being in the world other than an institutionally-guided or -produced one.

A key point of Illich’s argument is that unexamined and uncontrolled industrialization creates non-convivial over-specialized tools. It also creates a culture of consumption, often beyond many people’s ability to pay for what they consume. Control over both the tools of production, and the methods of certifying one’s suitability to interact with these tools, is polarized. As fewer workers with more highly-certified skills are required in an evolving advanced technological system, Illich states that polarization systematically disenfranchises and marginalizes the working class, leaving them in a greater state of poverty. One answer to this problem, he believes, is not equal pay for all, but equal work for all, including housework and other forms of work that exist outside the market economy (Illich, 1981).

Obsolescence

Obsolescence involves an imbalance in the “the power to make effective change” (Illich, 1973, p. 88). Illich maintains that the industrialized, bureaucratic world of capital compels a culture of obsolescence: “In the present scheme of large-scale obsolescence a few corporate centers of decision-making impose compulsory innovation on the entire society” (p. 73). This implies that, for access to up-to-date equipment, individuals must be certified in non-convivial educational systems to acquire information and to do their work. Obsolescence also maintains environmental and economic repercussions for a society. The grading of people in a class-based system, according to how current their tools and skills are, is another by-product of industrialized and capitalized society.

As noted in the discussions of radical monopoly, polarization, and overprogramming,

access to the switches of power is mediated by institutional certifications, especially education consumption. These are ever-escalating, Illich (1973) points out. The more prestigious the institutional certification, he notes, the more power access one has. Certification prestige results in more socially “valuable” people, with “more legitimate ... claim to high-level packages of industrial outputs” (p. 71). He argues that the perceived legitimacy of those claims (such as professional skills or identities), discounts, abuses, or exploits those in developing countries, who are female, of non-European descent, or who are otherwise marginalized by the institutions who certify value. A common strategy to emancipate (or empower) socioeconomically marginalized people is to call for more education or access for these groups (c.f. Greene, 2021). That strategy seeks to ensure that these groups are also certified by legitimated institutions. However, Illich believes that strategy is simply reinforcing the extant social certification mechanisms for the privileged members of those groups, by escalating the necessity of more and more certifications. This process allows the socioeconomic groups who are in power to stay there, since these certifying groups “hold power by concession from an elite whose interests it props up” (Illich, 1977, p. 17).

A constant drive toward efficiency and progress, involving structural and planned obsolescence renders human value and the needs of communities and individuals themselves obsolescent. He warns that, “At this point the balance among stability, change, and tradition has been upset; society has lost both its roots in shared memories and its bearings for innovation” (p. 90). The answer to this drive toward constant technological innovation, which Illich claims is often non-convivial, is in the reclaiming of human value on the basis of people’s own aims and capabilities. These aims and capabilities may involve technological innovation, but in the service of the interdependency and a balanced path toward *eudaimonia*, or human flourishing.

Frustration

However, reclaiming human value on the basis of people’s own aims and capabilities is a challenge when the radical monopolies, overprogramming, polarization, and planned

obsolescence of “efficient” tools are naturalized to the point where the tools themselves provide the logic by which people think (Illich, 1973, p. 92). He believes that each of these ways in which non-convivial power relationships are produced result in frustration for most of our society. But Illich is speaking of a particular type of frustration here. This frustration results from “compulsory though engineered satisfaction” (p. 62). As people obey and internalize the logic of the non-convivial tools, they feel frustration resulting from some awareness that the engineered satisfaction is not authentic, or they *themselves* are obsolescent or inauthentic.

Frustration emerges from radical monopoly when people feel conditioned through radical monopolies to only use the tools that have been socially legitimated, even if other tools would better help them attain their goals. Frustration blooms when people notice their overprogramming, and realize that some of the seemingly necessary certifications to do work are not truly necessary, or when they begin to question the value of institutional goods. Frustration spreads when people note the discrepancies of polarization, and the widening gap between haves and have-nots. And frustration metastasizes when people realize that they will never be sufficiently certified and legitimated, but must always seek more skills and ways to demonstrate their value to the tools that now dominate them.

The institutions and other structures that humans created have gotten too large, and careened out of control, Illich believes. In the imbalances described above, once-convivial tools have accumulated the power and privilege to operate all the switches. These are now non-convivial tools, that exert social control over who has the ability and privilege to make decisions (p. 71), sidelining most people from communal or even individual decision-making processes. This sidelining results in frustration. He believes that people are noticing that they are powerless, and they feel alienated not only from their labor, but from the tools that they themselves created and maintain for the sake of modernity, efficiency, and capitalism (p. 71).

Restoring Conviviality to Our Tools and Institutions

These four imbalances, radical monopoly, overprogramming, polarization, and

obsolescence—and a fifth factor less relevant to this research, biological degradation—along with the resultant frustration, describe a world filled with non-convivial tools. This is a problem of freedom and dignity, Illich (1973) states (p. 25). He believes that we must develop convivial tools to tip the balance of power back toward individuals and local communities. He believes his book “confronts people with a choice between convivial tools and being crushed by machines” (p. 104). This argument is similar to those developed by the Frankfurt School philosophers Horkheimer, Adorno, and Marcuse. And Illich’s convivial tool theory is, in part, pushing back against neoliberalism, which David Harvey (2005), defines as:

a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade. The role of the state is to create and preserve an institutional framework appropriate to such practices (p. 3).

Harvey goes on to say that neoliberal theories of technological change or advancement “becomes so deeply embedded in entrepreneurial common sense, however, that it becomes a fetish belief: that there is a technological fix for each and every problem” (p. 68). This fetishization of technology and technosolutionism, as well as concerns regarding a focus on individualism, entrepreneurialism, and market ideologies is the basis for some critique of the Maker Movement and makerspaces (e.g. Bardzell et al., 2017; Foster & Boeva, 2019).

Illich (1973) spends much of *Tools for Conviviality* describing the reasons that convivial tools are necessary to achieve a just culture, or as he terms it “survival, justice, and self-defined work” (p. 26). He uses Marx-inspired arguments against leveraging of human lives as tools of production in an increasingly mechanized world. Illich argues that people become the tools they use, for better or worse, saying that he either shapes tools in his self-image, or the tools shape him (p. 22). His argument maintains that the dependence on efficient tools renders a person a slave to a system that does not have their best interests at heart, but rather focuses on capital.

The pace of specialized development, Illich argues, is antithetical to human liberty. He describes the society of the 1970s as an industrialized, capitalized, warmongering society of

oppression and exploitation of the many and privileging of the few. He does hold out some hope, though. He believes that through a revolution of recasting our tools into convivial molds, we can attain social justice and freedom. He goes on to offer a way to curb the imbalances he identifies. To restore the “balance of life” (p. 31) and liberty, he says that boundaries must be set through political means, to limit development of non-convivial tools. For example, a mandated reduction of carbon footprints may require limits on the advancement of certain tools, but Illich would argue that this is necessary to avoid biological degradation. In essence, he says, we must slow development to explore what contributes to *eudaimonia*, and use political structures to reform extant non-convivial public institutions—including the political institutions themselves.

To develop more convivial tools, Illich (1973) calls for a new type of research, to supplement or replace the research that seeks to develop new products and to further the human capacity to consume. He calls this “counterfoil research” (p. 92), which is the foundation of this study. Counterfoil research aims to understand the relationships of people and tools and the social implications of these relationships. This research will be “concerned with the discovery of general systems of institutional structure which optimize convivial production” (p. 98), and hopes to determine the impact the institutional development of convivial or non-convivial tools has on people.

Problems with Illich’s Theory

Ivan Illich’s (1973) work is lacking in four main areas. First of all, the limits on tool development that he describes as necessary may be so constrained by his technological vision from the 1970s as to be untenable 40 years later. Or not—perhaps counterfoil research would find that legally restricting commuter transportation to the speed of a bicycle is best for human and biological flourishing (p. 95). Nevertheless, some of his arguments may seem naïve, Luddite, or short-sighted in the face of the technological advances of the last decades. In some respects, his anti-development stance is as dangerously simplistic as a technologically deterministic argument that simple physical access to informational technologies will be emancipatory (Bookchin, 1982).

Although Illich is not simply describing a limitation on technological development, a systematic understanding of which technological developments allow for convivial or emancipatory relationships would, by necessity, require an understanding of the interwoven impacts of such tools, as well an understanding of how to adapt social structures to promote conviviality.

Second, and more importantly for the purposes of this dissertation, Illich (1973) offers few descriptions of the processes of power in the decision-making, implementation, or development of the convivial tools he describes as necessary. As a “mystic poet,” as Neil Postman (1976) labels Illich, he does not trade in specificities, but in grand sweeping visions. He does not describe how his convivial vision would manifest on an individual level. Illich glosses over the political and social processes by which convivial tools could be mandated or created. He himself states that his intent is not to provide an “engineering manual for the design of convivial institutions or tools” (p. 27). He further argued that his criteria for convivial tools should be considered “guidelines to the continuous process by which a society's members defend their liberty, and not as a set of prescriptions which can be mechanically applied” (p. 38). Yet in the absence of such criterion, which tools are convivial and which are not is not clear.

Third, Illich never explicitly defines the term *power*, and often uses it alongside terms such as *control*, *freedom*, or *authority*, also without defining them. Just as there is a gap in what LIS authors mean when they use the term *empowerment*, Illich leaves one wondering what he means when he uses the word *power*. He uses the word in a power-as control or domination context (e.g., p. 67). He uses it as power-to or agency context (e.g., p. 28) or as decisional power (e.g. p. 29). This power does not emit solely from an individual. Instead Illich’s power is socially negotiated through interdependence, avoiding the concept of libertarian individualism. He also speaks of energy-as-power (including manpower, electrical power, and so on) as analogous and complementary to the power to do things or make decisions (e.g., p. 21). When tracing physical energy production back to preindustrial societies, he believes that the control institutions and governments have over the mechanical and electrical power that runs the world coincides with and drives political and social power. Yet his lack of clarity about the term *power* is a flaw in his

work.

Finally, Illich (1973) never discusses the ways in which individuals impact the institutions they use. In the sociological agency vs. structure debate, Illich's theory is situated in the critique of structure. Although he weighs in on the agency side of this debate, he concentrates on the power in institutional structures:

Increasingly, institutions have not only shaped our demands but also in the most literal sense our logic, or sense of proportion. Having come to demand what institutions can produce, we soon believe that we cannot do without them. (p. 31)

This ignores the potential for individuals to change or adapt their tools to meet their own needs, either through what Giddens (1984) calls the "duality of structure," through Certeau's (1984) "tactics," or what Scott (2008b) labels "weapons of the weak." In those theorists' work, individuals act upon the structures that are also acting upon them. Illich's theory does not discuss a way in which individuals may enact their own agency within the organizations they use as tools.

These four shortcomings about his central theory illuminate the overarching problem with Illich: He is not always a clear conceptual thinker. His work on convivial tools has inspired many practitioners and scholars in various areas of design, computing, development, education, and Library and Information Science (e.g. Cabitza et al., 2015; Caire, 2009; Fischer & Lemke, 1988; Hinchliffe & Whatmore, 2006; Johri & Pal, 2012). Yet his theory of convivial tools has too many gaps to be thoroughly operationalized as it stands. He does not outline precisely what affordances or capabilities are included in a convivial tool. He does not describe the precise processes by which a society benefits in using tools, nor how one should design such a tool—the decisions made by the designers and users. He does not lay out the social processes of controlling, providing, or safeguarding such tools. In this dissertation, I will use the findings of this study to fill this gap, and explore specific processes of power that make these library makerspaces more or less convivial for their users.

Defining Power

Power is a term employed throughout discussions of public libraries, and LIS in general

(e.g. Anttiroiko & Savolainen, 2011; Carr, 1986; Henington, 1994; Mates & Booth, 2012). The public library professional literature often mentions the word “empowerment” (Barrie et al., 2021; e.g. Cooke, 2010; Dutch & Muddiman, 2001; Elbeshausen, 2007; Maack, 1997; Nicholson, 2019; Wittenbach, 2005; Yoshida, 2013), but the term is often undertheorized in the literature. Some scholars, such as Hand (2005), engage the concept of “empowerment” critically, to explore how the uplifting “self-improvement” of yesteryear has become the “empowerment” of today through mediating technologies. Illich makes similar claims. However, the methods or determinants of empowerment are generally left uninterrogated, as well as any clear definition of what empowerment is, as either a verb or a noun.

As I will discuss in Chapter 3, while many public library articles use the word *power* or *empowerment* without explaining what it is, or how it might work, there are some exceptions. Works by Black (1991, 2005; Black & Pepper, 2012), Cram (1999), Lepik (2014), and Jensen (2004) do investigate power as a theoretic concept in the context of librarianship. However, just as Illich neglects to define precisely what he means by power, so too do many LIS scholars. These authors sometimes do not explicate the concept, even when it is the subject they are investigating. In LIS, when the concept of power is elucidated at all, it is commonly situated using a few key theorists’ work, including Pierre Bourdieu, Michel Foucault, and Anthony Giddens. John Budd (2003) does define power, as a form of cultural domination, or *power over*. He invokes power theorist Pierre Bourdieu’s concepts of power when he states that, “Libraries have, for most of their existence, been engaged in symbolic power in a number of ways that have become submerged in an orthodoxy of practice” (pp.23-24), but that they are often non-reflexive regarding the power implications of their work. He suggests that this lack of awareness of one’s own *habitus* may be why the term *power* is rarely defined in public library research.

To avoid the gap in many LIS studies, and in the gap in Illich’s own work, I am using the term *power* to describe *power to* accomplish some goal, which is Giddens’ (1984) definition. Power also involves *power over*, or what Foucault (1980) would label *domination* or *control*. I will use the word *control* to denote this type of power. *Agency* is equivalent to the *power to* concept.

For Giddens (1984), “Agency refers not to the intentions people have in doing things but to their capability of doing those things in the first place (which is why agency implies power)” (p. 9). *Agency* implies the capability of choice or free will in a way that the term *power* may not, because agency involves action and decision-making. As such, *agency* invokes the capability of the actor, which may be human, or may be a non-human entity that has human agency and values embedded within it.

Practice theorist Anthony Giddens (1984) describes the processes by which institutions structure their power relationships in tandem with their users, highlighting the decisions that are made regarding resource allocations and policies, as well as the value judgements that underpin these decisions. He describes the *duality of structure* to indicate how institutions enable and constrain individual agency; while meanwhile these structures are enabled and constrained by individual agency. In other words, the institution may create rules or allocate resources (“the media through which power is exercised,” p. 16) in ways they deem beneficial, but the users of the institution may push back against the rules and disagree with the allocations, thus shifting how a responsive institution makes its decisions.

Giddens describes how power is enacted as resources are authorized and allocated, and through institutional power to create rules, to signify what is relevant and valuable, and to legitimize their aims and methods. However, he states that the users of the tool also have significant power, even if they do not always recognize it: Users can shape how or whether they use the tool and how they legitimize or signify the value of the tool, even if they cannot use it. In light of Illich’s (1973) convivial tools theory, Giddens is describing a way in which the designers or institutions that offer a tool may negotiate its conviviality with its users. For example, while users often have little choice in the way resources are allocated for a tool, an application of Illich’s (1973) theory suggests that the ability to make decisions about resources is part of what makes a tool convivial. In the absence of a definition from Illich, I chose Giddens’s simple definition of power to reflect the recursive nature of the topic at hand: both libraries and the people that use them have power. Some of this power exists within political structures, but other forms exist

within individual responses and engagement with the tool of the library.

Convivial Tools and Public Libraries

Illich's (1973) conception of the convivial tool corresponds with the discourses of what the public library creative places are, who may use them and how, and to which purposes they may be put by their users. This is the case both in the library literature and in the data gathered during the study. Convivial tool theory is the most reflective of the power relationship theorized for these spaces. Illich's lines of reasoning regarding the imbalances of radical monopoly, overprogramming, obsolescence and subsequent frustration most directly echo the findings of this study. Finally, Illich's focus on convivial relationships embraces the Greek concept of "*eutrapelia* (or graceful playfulness) in personal relations" (p. 13). This focus echoes and grounds my overarching research project: understanding how information and cultural systems may further *eudaimonia*, i.e., human flourishing, especially in ways that do not always align with traditional economic or educational social values. Play, self-expression, and relationship-building are some of those ways.

In surveying increasingly targeted and limited mechanistic gadgets, institutions, and professions, Illich (1973) calls for tools that could inexpensively and easily achieve many ends. He evaluates the public institutions of 1970s America and decries the tendency of institutions themselves to "become draft mechanisms to press people into complicity with output goals. What is right comes to be subordinated to what is good for institutions." (p. 25). Such institutions create radical monopolies in which social control emerges in the wake of required certifications, or other products that only the institutions are able to provide (p. 67). In contrast, he considers alphabets and printing presses convivial tools (p. 79). These, he says, allow for a range of uses and broaden users' capabilities.

Illich (1973) notes that public libraries are also structurally convivial tools (p. 79). Anyone (ostensibly) can use them easily and for any purpose they choose. No one is forced to use the library. One may read to learn or for pleasure or for other reasons, and it is easy to access the

library and its collections. The collections are arranged and maintained to serve the needs of the users, and the freedom to read (and later, to view audiovisual materials) is afforded by the designers of this tool. Libraries rely on social interdependence to achieve individual and collective goals. In fact, public libraries, in what Illich considers their ideal state, meet all the criterion for convivial tools. When librarians control the use of materials through non-circulation or restrictive policies, or computers require advanced digital skills to locate materials, they become, to Illich, less convivial.

Illich speaks about:

“Two ranges in the growth of tools: the range within which machines are used to extend human capability and the range in which they are used to contract, eliminate, or replace human functions. In the first, man as an individual can exercise authority on his own behalf and therefore assume responsibility. In the second, the machine takes over--first reducing the range of choice and motivation in both the operator and the client, and second imposing its own logic and demand on both. (p. 85)

This characterization appears to argue against many of the tools commonly associated with makerspaces, including 3D printers, laser cutters, and so on. For example, 3D printers aim to replace the need for skilled artisans in creating complex objects. Such tools do impose their own logic on the users, and require a certain level of skill—though less skill than would be required than if one were chiseling or tooling a similar object using more traditional tools of production.

Ivan Illich’s theory of the convivial tool, though not fully operationalizable as he wrote it, provides a rich ground for investigating power in public library makerspaces. Whether these spaces under investigation here are convivial, and how they attain conviviality or non-conviviality, is a question this project seeks to understand. In Chapter Eight, I will expand on Illich’s theory of convivial tools based on the data, to describe the seven capabilities the findings revealed as crucial to the conviviality of the public library makerspaces. But before that, in Chapter Three, I will explore how issues of power have been explored in LIS. I will describe how library makerspaces have appeared in the literature and what scholars and practitioners have to say about them. And I will touch upon the phenomenon of makerspaces and making outside of

public library contexts, to understand what is known or theorized about making in other areas.

Convivial Tool Theory in the Empirical Literature

Because convivial tool theory speaks to individual power in light of institutions as tools, it has been used to frame empirical research having to do with designing and implementing tools, including information systems. Such tools are for people to decide how and when and for which purposes they use them. As libraries develop creative places that they often implicitly describe as convivial, they are developing new technological tools for their user. These technologies are situated in a larger economic and social environment, which Illich (1973) was responding to when he wrote *Tools for Conviviality*. In calling for control over technological development, and identifying social issues that are “not a crisis within industrial society, but a crisis of the industrial mode of production itself” (p. 107), Illich was reflecting the work of Marx (1992), Marcuse (1991), Horkheimer and Adorno (2002), Foucault (1977, 1980), and other social theorists. Illich’s work was not as influential as others in the Frankfurt School or other critical theorists, either at the time, or over the decades that followed. In fact, some professional circles, such as education, have silenced him for questioning institutions and their value (Gabbard, 1993). Furthermore, Illich was less a full social theorist than a social witness and critic, and his philosophy was never meant to be comprehensive (Hoinacki & Mitcham, 2002).

Nevertheless, it was influential in some arenas. For example, early pioneers in personal computing, such as the Homebrew Computing Club members Lee Felsenstein, Steve Wozniak, and Steve Jobs internalized the ideas in *Tools for Conviviality* (Gauntlett, 2018; Momméja, 2021; Morozov, 2014). Felsenstein was inspired by Illich, and built the first anonymous social network by installing computers in public access points (including a public library) in San Francisco:

Felsenstein's political project, of building computers that would undermine institutions and allow citizens to share information and organize, was recast [by Jobs] as an aesthetic project of self-reliance and personal empowerment. (Morozov, 2014)

His idea of the convivial tool drove the ways in which these personal computing pioneers

understood the flexibility and utility of the tool they were creating (Petrick, 2017).

Despite Illich's obscurity in comparison to theorists of power such as Foucault, he has been used in the disciplines of theatre, language and semiotics, social work, urban planning, development, and education, sometimes in ways that are pertinent to this study. For example, Ellenhorn (1992) leveraged Illich's theory as a tool of critique of social work. She focused on his concept of "active mastery" in ensuring people are not used as means to an end, or tools, by institutions or professions, but are instead served by them. Just as this study examines the conviviality of an institution aimed at helping people, Ellenhorn examined the conviviality of social work. Ashby's (2004) study of the semiotics of a language textbook took on the concept of conviviality, and challenged it in light of the fact that a tool that is convivial for one group may be non-convivial for others. She posited a necessary condition of unequal power relations between majority and minority groups, even when tools are convivial. This study also seeks to explore issues of convivial divergence between groups. Taylor (2004a) took this work further. In her work on audience participation with pantomime theater she introduced the concept of the *conviviality mask* as a temporary power relation that dissolves when that pantomime is over. She wondered, "whether it is possible for convivial institutions to exist, other than by simply creating another set of power relationships and social orders that, during the moment of involvement, appear to allow free rein to individual expression" ("Conviviality", para. 2). She went on to describe the return of alienation and fragmentation after a false sense of conviviality in the theatre. In Taylor and Ashby's (2004) conceptions of conviviality, problematic institutional-individual power relations appear deceptively balanced by the conviviality or conviviality masks. These two theorists are in the minority, however. Most other theorists using convivial tool theory frame it positively.

Convivial tool theory does occasionally surface in areas of LIS-related research, including human-computer interaction (HCI), design, community informatics, and information and communication tools for development (ICT4D). It has been applied to related fields of design and computer science. Illich's work has barely been applied to public libraries or librarianship,

however.

LIS and Allied Fields

Computer science researchers have continued to use Illich's conceptual framework to develop better computer systems (e.g. Fischer et al., 2005; Fischer & Girgensohn, 1990; Fischer & Lemke, 1988). Fischer and his co-authors described conviviality in computing systems, with a spectrum of conviviality from programming languages being the most convivial tool, and turnkey computing systems as the least. But these authors noted that more user control is not always better, even from the perspective of the user.

Patrice Caire (2007, 2009; Caire & van der Torre, 2009) explored the concept of conviviality in relation to computer science, web communities and digitally-connected urban environments, simplifying the concept until there was a way to measure the conviviality of a system quantitatively, though her conceptualization differed from the concept Illich (1973) espoused. Caire (2009) defined conviviality as a "set of positive relations between the people and the groups that form a society, with an emphasis on community life and equality rather than hierarchical functions" (section 2, para. 1). In her work on multiagent dependency systems, she and her coauthors went on to describe freedom in the context of the ability to make choices (Caire et al., 2011). Conviviality in that context is a simplified concept that encompasses the ability to choose to interact with a wide array of people, when "each member's perception is that their personal needs are taken care of" (p. 895). Caire (2007) further distanced the term *convivial* from Illich's concept in her work on digital cities, resituating it as simply technologies that are "people-centered." The conviviality measures these researchers proposed extended the more commonly used metrics for assessing dependency systems, efficiency and stability (Caire et al., 2011; Caire et al., 2008).

These researchers believe that conviviality measures will assist in building better systems, "since more convivial systems have more opportunities for agents to choose their partners, and therefore are also more robust when partnerships break up" (Caire et al., 2011, p. 902). The

measures are quantitative formulae that can be applied to computer science systems. Caire et al. also explored the concept of “conviviality masks,” or the ways in which technology can mask power relationships to allow for a smoother social interchange. By obscuring status and social roles, and facilitating etiquette and discretion, convivial tools can expand the interdependence, stability, and efficiency of a system, they argue. Caire and her co-authors positioned conviviality masks as useful ways to remove the perception of power inequities from digital interactions, but did not problematize the concept, as did Taylor (2004a), from whom Caire et al. drew the concept of conviviality masks.

Human computer interaction, or HCI, explores the interface of people with digital tools, often at the micro-level. The design and implementation of computers and their applications, as well as the concept of the “information society” is regularly explored using Illich’s theory of conviviality. For example, Lamizet (2004), described conviviality as “a major theme of the new information and communication technologies, and thus represents an essential characteristic of contemporary practices in cultural mediation” (translation from the French). He described 4 characteristics of conviviality as: the valuation of the subjectivity of experience (such as the users’ ability to choose in interacting with an interface); the popularization and diffusion of information and communication technologies (ICTs); the simplification of using ICTs; and the standardization of ICT logics. Just as Illich stated that social structures could be convivial tools, Lamizet described conviviality as an institutional structure that furthers social connections and technological processes that are easy for users to control and use with pleasure.

In user-experience-centered dissertation research, Sascha Kaufmann (2010) built a model of conviviality applicable for web-based tools. To do this, Kaufmann expanded the sociological definition of conviviality to apply the theory to web-based applications. Kaufmann determined that convivial sites must fulfill two criteria, “The user should be aware that he [*sic*] is part of a (social) group and be able to interact with it... [and] The system should be user-centric designed” (p. 16). Kaufmann then combined a “wisdom of crowds” approach and convivial tool theory to build a convivial and usable recommendation system for web-based content. Caroline Bassett

(2013) used Illich's (1983b) call for silence, as well as discussing the concept of the convivial tool. She expanded the concept of conviviality to extend toward building a more functional commons, or public space, which can involve either speech or silence. While Bassett targeted online social networks and did not mention libraries, this discussion is relevant to the inclusion of often-noisy creative places in an institution which, while rarely quiet in practice today, is often considered to be a quiet place.

Community informatics interrogates the impacts of information systems on communities at the meso-level of local groups, rather than the macro-level of social informatics that explores broader social impacts. Community informatics scholars focus on the ways in which these information systems help communities to develop or meet their needs. The communities may be congruences of place, interest, practice, or networks that are supported by information infrastructures such as the internet. In this area of LIS, Cabitza et al. (2015) extended Lamizet's work. They used Ivan Illich's concept of *conviviality* as a sensitizing concept to explore new directions for this subfield to explore. These authors created a model of conviviality to assist the field of community informatics to strengthen and deepen their engagement with analysis of tools' impacts. They described a model of affordances that will embrace conviviality as a pathway to communication and cooperation, highlighting the sociality and cooperativity of the convivial tool. They were careful to define conviviality as an "*emerging collective property* of a community, which nevertheless is composed by individual feelings, that is a condition their members can enjoy and exhibit in a perceivable (observable) way." They stated that "conviviality relates to the quality of the relationships occurring between community members and between them and the social structure to which they feel they belong." They believed Illich's theory can help researchers in this area to understand the affordances of tools and develop ones to better serve network communities.

The observable ways Cabitza et al. (2015) proffered to measure conviviality include quantitative psychometrics of happiness, life satisfaction, social engagement, self-efficacy, anxiety and depression. They believed that through studying information systems using such scales, one

could create an overall indicator of the impact of information technologies. They concluded that conviviality is a critical affordance for community tools, and as such may be used as one of the overall indicators of ICT impacts, along with sociability, or the ability to interact with others. They state that convivial artifacts or tools could embody the following principles: Collaboration-orientedness, selective inclusiveness (which requires some permeable boundaries for defining the identity of the social structure, through community-selected policies of inclusion), and *bounded* openness (openly accessible and easily appropriated for community concerns). These principles and definitions help to operationalize Illich's work for use in LIS research.

Other researchers interested in information technology design and implementation use Illich's convivial tools theory to point out potential problems with the power relations hidden within the affordances of ICTs. Jandrić (2011) describes the ICTs used in education as radical monopolies foreclosing less technically-advanced methods of learning, and encourages educators to take a moral stand against such non-convivial tools. Dan McQuillan (2016) describes a way in which predictive algorithms could be mobilized convivially by challenging the seeming authoritativeness of data-mined patterns. He sees predictive algorithms left unchecked as a "megastructure of conditioning, controlling our responses by its own response of excising certain possibilities" (p. 9), and suggest that we use counterfoil research to understand how our tools facilitate or block users' goals and needs, centering this research on a social justice narrative. Douglas Kellner (2006) and co-authors (Kahn & Kellner, 2008) marshalled Illich's convivial tool theory in describing media literacy and the potential for collaborative and convivial work sharing learning with students. While these are more theoretical papers, they are aimed at supporting policy development that ensures conviviality and justice in information systems. Kozubaev and DiSalvo (2020, 2021) touch upon Illich's concept of conviviality in their work on design and public libraries. They call for convivial relations embedded within the affordances of libraries through a "design fiction," a pretend IMLS grant-funding document from the future that highlights the potential of using conviviality to drive library services, as "oppositional to dominant logics of market capitalism" (Kozubaev & DiSalvo, 2020, p. 189).

An overlapping subfield, information and communications technologies for development (ICT4D), occasionally leverages Illich's theory as well. In the best example of this, Johri & Pal (2012) offered one of the most useful models of conviviality to further the development of information systems in developing countries. They linked the conviviality concept to Amartya Sen's capability approach to social justice, crafting the Capable and Convivial Design (CCD) model. They took four concepts from Sen: accessibility (including sociocultural accessibility), creativity/intensification (in which users go beyond accessing a tool but to find joy in using it and expressing themselves), accomplishment of self/others (including self-respect, power relationships and relationship-building), participation/collectivity, (which addresses collaborative or collective action). They then married these concepts to those provided in Illich's convivial tool theory to develop the CCD model. This model calls for the following factors in designing and providing informational tools:

1. Access to artifacts (accessibility easiness)
2. Ability for self-expression (expressive creativity)
 - a. Ability to use personal energy creatively
 - b. Ability to personalize the environment
3. Ability to interact and form relationships with other people (relational interactivity)
4. Opportunity to enrich the environment (ecological reciprocity) (p. 67)

The authors then used this new CCD model to assess a case study of low-income children's practices in sharing one computer. They found several ways in which software could be developed to better meet the needs of the multiple users, given that nearly all software was developed for a single user, using the CCD model. The authors believed the addition of Illich's concept of conviviality can "reconcile the individual-oriented nature of Sen's work with institutional structures in a more pragmatic manner" (p. 67).

The CCD model is used in several empirical studies and theoretical papers. Poolman (2012) questioned whether this model can lead to *eudaimonia*, or human flourishing. She

critiqued the notion that a CCD system will lead to equitable outcomes, because of the inherent challenges of managing ego-centric attitudes or the privilege some people already enjoy in current systems. Nevertheless, the CCD model is used in other studies. Chirumamilla and Pal (2013) used CCD to discuss design for the purposes of play and information and communication technologies in developing nations. They expanded what they consider a narrow application of ICT4D for socioeconomic reasons to include “non-productive” activities, which they pointed out are “just as constitutive of a life-world as more pragmatic pursuits, like seeking employment or saving money” (p. 28). As they disputed the historical narratives of development, in which the people to be “developed” are somehow lacking, they focused on the issues of power that designers and developers have, and how their means and ends may not match those of the people they purport to serve.

In the area of education and development, Slavova (2014) used this CCD model to discuss participatory design processes for empowering teachers and school administrators with the help of advanced technologies. She focused on the collective capabilities enabled by projects designed using the Capable and Convivial Design model. She was careful to note the privileged position of the designer in this process, and that design should be done through pluralist and participatory engagement. Moreover, she offered a useful definition of empowerment, which the library literature tends to avoid:

Empowerment is viewed as the intersection of agency and existing opportunity structures; where agency consists of the capacity of individuals to make meaningful choices, measured by endowments of psychological, informational, organizational, material, social, financial and human assets. (p. 1)

Schmitt (2017) developed Johri and Pal’s (2012) CCD framework in the area of personal knowledge systems, describing twelve criteria for a capable and convivial system. These twelve criterion he labeled “Exciters and Delighters”: accessibility easiness, operable autonomy, expressive creativity, collaborative choice, relational interactivity, creative conversations, ecological reciprocity, personal mastery, institutional performance, innovative capabilities, encouraging empowerment, technological progress. Schmitt presented these criterion in a

progression from the individuals' interaction with technologies to social knowledge and collaboration. He described this system's potential for assisting knowledge workers' development and autonomy in a business setting. His theory could be useful in devising what he termed "enabling spaces and affordances" (p. 63). However, Schmitt did not cite Illich in his description of this work. He seems unaware of the origin of convivial tool theory.

Johri and Pal's (2012) Capable and Convivial Design model, as well as the one laid out by Cabitza et al (2015), is used as a sensitizing device in the collection and analysis of data for this study. Moreover, these models could be used in a range of LIS applications.

Public Libraries

In extensive literature searches¹ for public library research involving Ivan Illich's theory, a few authors leverage his ideas, though he is appearing more in the literature in the last few years. However, the connection between Illich and public libraries emerges via computer pioneers in the Homebrew Computer Clubs reading Illich and Stewart Brand's Whole Earth Catalog (Brand was an Illich advocate) and installing one of the earliest public access terminals in the San Francisco Public Library, intended as a convivial tool connecting people via an electronic bulletin board (Momméja, 2021).

Soon after Illich (1973) published *Tools for Conviviality*, Watson (1977) was already describing a convivial public library model. He cited reference services, the free and non-coercive access to materials of one's choice, and the coordination of the interconnected learning webs, which Illich (1971) calls for in his educational work. Watson also foreshadowed makerspace activities by calling for skill exchanges and peer-matching peer-based learning and sharing opportunities, to be supported by public libraries. In 1982, a brief report of the Annual

¹ Searches were done for "TX Illich AND TX convivial* AND TX public librar*", "((ALL=(illich)) AND ALL=(convivial*)) AND ALL=(public librar*)", "illich AND convivial* AND ((public library) OR (public libraries))", and similar queries in the following databases: Library, Information Science & Technology Abstracts with Full Text, Library Literature & Information Science Full Text, and Web of Science resulted in 6 (2 of which were my articles, and 2 were book reviews), 1, and 1 result (my article), respectively. 32 articles in the Association of for Computing Machinery's Digital Library almost entirely mentioned libraries in passing, and the same was true for Project Muse's 220 returns, most of which were books that had little or nothing to do with public libraries. The most fruitful search was in ProQuest Dissertation and Theses database, which found 4 pertinent items, 2 of which were in English.

Conference of the Canadian Library Association describes the keynote speech based on Illich's work (Illich himself was to deliver the keynote, but was ill) and which called for librarians to take traditional roles in instilling knowledge, preferring the "role of the librarian a "midwife" to knowledge and ideas" (p. 1619), which may not be a statement Illich would have endorsed.

Barber (1983) wrote a master's thesis to explore the concept of conviviality in relation to the concept of the information society. He discussed public and other libraries, positioning Illich's claim that public libraries were convivial in Illich's personal comfort in accessing libraries. Barber claimed that "conviviality is...dependent on individual circumstances and training or indoctrination" (p. 41). Barber went on to discuss library classification, which he considered rigid, conceptually hierarchical and authoritarian, and requires training to use, as less convivial. He considered library stances toward "editorial policy" or intellectual freedom more convivial, stating that public libraries tend to limit restrictions on information and keep information accessible.

Linda C. Smith (1980) situated Vannevar Bush's memex technology as a convivial tool, and Pfaffenberger (1992) aligned open access movements in public libraries with the concept of the convivial tool. Otherwise few significant mentions of Illich's concept emerged in the public library literature from the 1970s to the 2000s, until David Carr (2000) described the "incendiary moments" of learning that were possible through convivial tools of public libraries and museums. He states that such learning occurs through assistance, convivial tools, open forums for connecting with others, and power relationships involving:

autonomy, meaning independence from authority, freedom from any evaluation other than meeting the learner's own satisfaction, freedom to accept or reject a mentor; ...[and] control and authorship of an inquiry, for example, frequent opportunities to revise the themes and patterns of an inquiry or to abandon it altogether (p. 132).

Carr positions learning in this context as revolutionary, liberatory, and socially connective.

In the 2010s Illich's theory became more common in the public library literature. In his discussions of a case study of the Birmingham, in the UK, Paul Blewitt (2012; Blewitt & Gambles,

2010) and his co-author describe a modern library development project. They depict the thought processes behind the project and the design of the library space as reflecting Illich's ideas, as well as community feedback. The library allows for formal and informal learning, social connections, and cultural activities. The authors echo Illich in their call for "significant deschooling, deinstitutionalisation and deprofessionalisation" (Blewitt & Gambles, 2010, p. 110), to reframe public libraries back to what they believe they were originally: people's universities. To accommodate these aims, the authors determine that through intensive discussion with the people they are serving, and "commitment to local democracy, civic participation, learning, development, and spatial and social justice" (Blewitt & Gambles, 2010, p. 54), their library will expedite "long sought after policy goals of social connectedness, community empowerment and lifelong learning" (Blewitt, 2012, p. 110). Blewitt and Gambles emphasize empowerment and power issues, using Illich and theorists Marcuse, LeFebvre, and Foucault to illustrate how the development of this library ensures that Birmingham residents have the right to the city and power to make their own decisions.

Dan Grace (2014, 2020; Grace & Sen, 2013) centers his work on Illich's theories of convivial tools, and the concepts *learning webs* and *commons* (Illich, 1971, 1981). Grace's work on resilient communities considers public libraries convivial tools for adjusting to climate change. He is the only author who explores the utility of Illich's theoretical framework to address LIS's need to develop and explore critical theory. In his work with Grace Sen (2013), explorations of power, professionalism and resilience emerge from an autoethnography of public library work. Grace and Sen touch on issues of librarian control, limiting user autonomy, and the fetishization of technology. They problematize the ideology of professionalism and managerialism as doxa aligning with market ideologies and class distinctions. Grace (2014) links all of these ideas together relative to community resilience and with public libraries when he posits the conviviality of public libraries as inversely proportional to their enclosure of information/knowledge.

Grace's (2020) dissertation explores the concept of convivial public libraries further. He

leverages the concept of the “vernacular” from Illich’s *Shadow Work*, as “autonomous, non-market related actions through which people satisfy everyday needs—the actions that by their own true nature escape bureaucratic control” (Illich, 1981). He establishes libraries as convivial tools to support this vernacular, and interrogates his own experiences in the library, as well as several others’ to establish what a convivial library would look like. He concludes that issues of professionalism that Illich (1973) also identified, capitalism and the “hegemony of the industrial” (Grace, 2020, p. 145) exist in library narratives and professional identities, despite a radical element to librarianship. He found that more convivial configurations of librarianship failed when he and a colleague approached the practice level of engaging with libraries, rather than the policy level. Although he sees “librarying” as a form of praxis engaging with theory and practice at the same time, that praxis was too informed by class and market interests to support convivial librarianship. He pointed to the inclusion of workshops, gardens, and kitchens within public libraries as a pathway toward conviviality. Finally, he defines a convivial library:

It is a process which cultivates differing knowledge practices that will be in productive tension with one another and allows for the democratic choice of use-values within society. (p. 200)

He wonders if he and his colleagues could have “started from a different point, one that examined already existing practices for traces of *conviviality* and fostered them instead” of attempting to build conviviality from the ground up (p. 154). This idea reflects what this dissertation is doing. Interestingly, Grace also analyzes his findings through dialectics or tensions between opposing or related concepts, as in this study. Unlike this study, but like Illich (1973), he resists offering a blueprint for establishing a convivial tool.

Public library scholars are beginning to answer Grace’s (2014) exhortation to use Illich’s theory in some depth to create theory and practice. Public library makerspace pioneer Jeff Ginger (2015), who was involved with the Community Fab Lab in Champaign-Urbana, wrote a dissertation describing convivial tool theory through the lens of David Gauntlett’s (Gauntlett, 2018) book *Making is Connecting*, first published in 2011. He focused on Illich’s contention

regarding a “necessary connection between critical self-awareness and active creation” (p. 202). Illich believes this connection is foreclosed by overprogramming until people are no longer aware of their own capabilities outside of institutionally legitimated processes. Ginger studied how public libraries in underserved communities furthered digital literacy. While he did not explore makerspaces in his study, he did note their role in potentially opening up avenues of digital literacy. Berget (2020) also mentioned Illich and the concept of convivial tools in public libraries, discussing the use of universal design practices to ensure equitable and usable spaces for all. This invocation was minimal, however, no more than a brief citation in a list. They cite Bigby and Wiesel (2011, 2015) at the same time, who use the term convivial in a way unaffiliated with Illich’s concept—more as a friendly brief encounter than any sort of power interaction. They may be misapprehending the concept of conviviality by linking these two types of understandings of the term.

In a few select studies, convivial tool theory, and making or makerspaces in public libraries all intersect. I will discuss these works in Chapter 3, which briefly explores the literature on power in public libraries, public library makerspaces, other makerspaces, and making.

Making and Makerspaces

Illich’s concept of convivial tools has been acknowledged in the discussion of makerspaces and making, though with little discussion as yet in the context of public libraries (Bradley, 2016; Grimme et al., 2014; Morozov, 2014; Toombs et al., 2014; Toombs, 2016; Troxler & van Woensel, 2016). One of the main populizers of Illich’s work in this field is media studies scholar David Gauntlett (2018). Gauntlett focused an entire chapter of his book *Making is Connecting* on Ivan Illich’s convivial tool theory. The main narrative of Gauntlett’s book is that a clear need to make, and to make together, has shaped our culture. Moreover, he states that people need to connect socially through making, and making offers an ideal tool to do so. He connected Illich to the World Wide Web as envisioned by Tim Berners-Lee and Howard Zittrain’s concept of *generative technologies*, which allow people to create what they need to

create to express themselves and live full lives. Gauntlett described some of our most-often used platforms, such as Facebook, as non-convivial. He discussed more convivial tools that can further the social connections and cohesion, happiness, and joyful self-expression, including YouTube.

Other scholars of DIY and making tools and cultures have connected the dots between Illich and making. In exploring the identities that makers express, Toombs et al. (2014) calls on Illich when they state that, “Tools provide opportunities for users to enrich the environment...Tools are thus future orienting, providing mechanisms for users to envision and then to bring about future worlds” (section 3, para. 6). As such, the authors argue, the use of tools—self-created tools—expresses a maker sensibility that is powerful and capable.

Susan Nascimento (2014) critically examines the concept of empowerment in making and peer-based production. She describes how using critical and democratic frameworks, including Illich’s, can assist in exposing the power relationships, assumptions, and inequities that are packaged within the affordances of the tools of making. Such frameworks are necessary to counter the narratives of so-called empowerment that she determines are often technologically deterministic. These current affordances and narratives about the tools of making assume that individual skills, physical access, and the technology itself will somehow drive our culture in just and equitable directions. Instead, she argues, these tools and technologies are not neutral. In fact, “the potential for empowerment in such trends and spaces may reside in a clear rethinking about the specific values, norms and relations, such as sustainability, social justice, fairness or responsibility, to be embedded in artifacts, and at the same time, about the alternative technological and social scenarios that may arise” (para. 15). She proposes more critical engagement with the design of the tools used to make things. She also calls for policies that reflect social justice and power relations as well as economic growth and skill building.

Toombs (2016) explores this idea further in his dissertation. He distinguishes between tools that “require their users to invest energy in learning to *operate* them, rather than *direct* them, and therefore do not help their users independently evaluate or interact in a meaningful way with the world” (p. 11). Toombs describes the type of active mastery necessary for a tool to

be convivial in his exploration of eight maker projects, and in online maker communities. Framing his findings in an ethics-of-care context, Toombs discovers several practices that are similar to “conviviality masks”: they pretend to promote care and inclusion in the makerspace communities, and do in some individualistic sorts of ways, but they are also exclusionary. These practices include policies that appear empowering and kind, but can also foreclose conversations about conflicting values, or communal action.

Other authors have also utilized Illich in the context of making. Fleming (2015) writes of makerspaces in schools, and links them to convivial tool theory, as well as Illich’s (1971) theories of deschooling. She distinguishes the types of learning that emerge from top-down instruction versus more casual, convivial, and constructivist frameworks of making. She notes that there is some “secret sauce” (p. 37) in interacting with experts, learning from their deep skills and seeing that making can result in careers, but she also describes peer-learning as important in the makerspace. She then goes on to situate makerspaces in an entrepreneurial/market ideology, which suggests she is using Illich’s concept of the convivial tool at a shallow level. At a deeper level, Lankshear and Knobel (2010) noted that the entire notion of DIY is pushing back against the concerns Illich raises about the “disabling” professions:

What people can do perfectly well for themselves has been rendered illegitimate, and, to the extent that legitimate services come at a price, what is readily available in principle has become economically scarce in practice. The result is a profound and disabling “disempowerment,” which includes being robbed of the opportunity to discover what one might in fact be able to do for oneself and, in many cases, do better and more to one’s personal tastes and beliefs than is “delivered” by a professionalized institution or bureaucracy. (p. 7)

This discussion of how institutional actors enforce professional values in the name of “helping” is one of the lines of rhetoric that Illich mobilizes in describing convivial tools. However, the public library literature does not reflexively engage with the concept of *dis*-abling “help” they might offer, perhaps because the library embodies the professional institution that Illich is critiquing.

De-growth is an area of scholarship that calls for more sustainable and resilient communities and economies through a reduction in both production and consumption, and the

resulting scaling back of economies to better align with social and environmental concerns. This often involves DIY, making, or makerspaces. Some have used Illich's ideas and the phenomenon of makerspaces to describe technological and economic paradigm shifts that lead to de-growth. Kostakis and his coauthors (Kostakis et al., 2016; Kostakis et al., 2015; Kostakis et al., 2014) use convivial tool theory related to peer production and makerspaces, as well as the governance of community hackerspaces. Kostakis et al. (2016) sees the potential of a model they call "design global, manufacture local" (DGML), which includes digital production as well as non-digital creation, as a way of being that reflects Illich's call for convivial tools. This occurs through local, on-demand production of items that might have been designed by a person on the other side of the world. This model centers on the shared use of tools and communities that share governance in equitable and just ways.

Hult and Bradley (2017) also focus on de-growth. They researched DIY and making in makerspaces as ways in which makers use convivial tools to resist capitalism and form collaborative relationships with others and with the environment one lives in. They use convivial tool theory to explain why such resistance and relationships are necessary for just, sustainable, and happy communities. They consider the "Bike Kitchen" makerspace in Sweden as a way to make an already convivial tool, the bicycle, even more convivial by offering a space with the tools, parts, and social knowledge to fix and build bicycles.

Summary

All of these areas of research and scholarship use Ivan Illich's 1973 treatise *Tools for Conviviality* to frame a world in which individuals share power with institutions, where people feel confident and powerful in their interactions with tools and making, and "survival, justice, and self-defined work" (Illich, 1973, p. 26). Whether the system or tool under investigation is a library, a makerspace, or some information technology, Illich's concepts help these researchers to ground their work in social justice and individual power.

As such, Illich's theory of the convivial tool, though not fully operationalizable as he

wrote it, provides a rich ground for investigating power in public library makerspaces. Whether these spaces under investigation here are convivial, and how they attain conviviality or non-conviviality, is the question this project seeks to understand. In future chapters, I will expand on Illich's theory of convivial tools based on the data, to describe the seven capabilities the study participants identified as crucial to the conviviality of the public library makerspaces. But before that, in Chapter Three, I will explore how issues of power have been explored in LIS. I will describe how library makerspaces have appeared in the literature and what scholars and practitioners have to say about them. And I will look at the phenomenon of makerspaces and making outside of public library contexts, to understand what is known or theorized about making in other areas.

Chapter Three: Public Library Makerspaces, a Literature Review

Even though most public library services are publicly funded, in-depth understanding of the community informatics of public libraries, or the impact of these informational (and social, cultural, and educational) systems on the communities they serve, has not been widely explored. When this project began, no studies existed in which public library creative place users and their experiences were the focus, though a few case studies supplied brief reflections of the users relative to a particular aspect of the space or to the case itself (Brady et al., 2014; Finley, 2016; Hartnett, 2016; Peltonen & Wickström, 2014). The gap in the literature began to fill, however (e.g. Boeva & Foster, 2016; Bowler & Champagne, 2016; Li & Todd, 2016b; Lopatovska et al., 2016; Lui, 2016). Still, little empirical work has been done to understand if library makerspaces are meeting the needs of their users, if they are doing so through processes of empowerment, or if a model of conviviality is possible or desirable as a tenant of the library faith.

Power and Empowerment in the Public Library Literature

The library faith is an example of what Patrice Flichy (2007) calls an *imaginaire*, and others, such as Lorraine Code (2006), call an *imaginary*. These imaginaires are collective visions about a sociotechnical system:

often-implicit but nonetheless effective systems of images, meanings, metaphors, and interlocking explanations-expectations within which people, ... enact their knowledge and subjectivities and articulate their self-understandings as knowers.... An imaginary is as productive in generating and sustaining images, metaphors, and operative idea(l)s that underwrite patterns of legitimacy and credibility as it is in situating and evaluating practices of scientific inquiry. Imaginaries are... self-reinforcing rather as self-fulfilling prophesies are: although ongoing "successes" within them consolidate their sense of rightness, it takes more than a few counterexamples to unsettle them (Code, p. 245)

Flichy argues that such imaginaires are necessary to implement some socially-beneficial system. This imaginaire is the seed by which systems are planted. In many ways, this seed expresses the institutional properties of a system, and often the practices that sustain it. To continue this metaphor, the imaginaire encodes the DNA of the resulting plant—the fruits of the plant will

align with the seeds' intentions. This acts as a weighty obstacle for anyone seeking change, working inside a system or coming from the outside. It also provides energy and momentum for those seeking to develop the system in accordance to the imaginaire's blueprint.

Part of the imaginaire, grounding the provision of public library services generally, and makerspaces specifically, is that they are empowering (e.g. ALA, 2014; Brady et al., 2014; Elbeshausen, 2007; Garcia et al., 2014; Hartnett, 2016; IMLS, n.d.-b; Meyer & Fourie, 2015). However, LIS research on issues of power often offer little conceptual clarity about what power means or how it is enacted in public libraries. While the LIS literature regularly invokes the concepts of *power* and *empowerment*, scholars rarely explicate the terms, nor do they always delineate the processes that develop or express power. The public library literature explicitly examines issues of power in many ways, including the following examples:

- as the ability to act or make decisions (Adkins & Hussey, 2006; Ladenson, 1962; Lebus, 1958; Smith, 1970), or as a form of soft power emerging through forms of attraction and non-coercive behaviors to set agendas, and through ideologies or narratives (Bell & Kennan, 2021);
- as empowerment, generally through personal development (Holt, 1996; Jacobs & Berg, 2011; Rooney-Browne, 2009), through sharing power to steer library services (Piper et al., 2009), through reading works that reflect particular narratives (Ross, 2009), or through social processes such as the distribution of social capital or by providing a public sphere (Ignatow et al., 2012; Widdersheim, 2015);
- as a socioeconomic issue, with power theorized as something males enact more comfortably (Ivy, 1985) or which is inequitably distributed according to gender (Buschman & Carbone, 1991), or socioeconomics and class (Chu, 1999; Pawley, 1998);
- as a relationship, and how that relationship strengthens or weakens library's services and community standing (Henington, 1994);
- as control: "Power equates with control over resources" (Henington, 1994, p. 98);
- as symbolic, with the processes of selection and classification materials, and the cultural production of librarianship acting as power (Budd, 2003; Olson, 2001);
- as cultural, also invoking Bourdieu, that was shared inequitably by people in different socioeconomic groups (Summers & Buchanan, 2018)
- as a legal issue, with powers enabled by the Constitution (Darling, 1979);
- as enacted through policies, such as Acceptable Use Policies for the Internet (Gallagher et al., 2015), or through intellectual freedom mandates and social action (Seiter, 2020);
- as a form of justice: for library employees (Latham, 2011; Latham & Ditzler, 2010; de la Peña McCook, 2008), or the profession (Huzar, 2013; Wiegand, 1986, 2007); or for individuals through the processes of literacy (Bossaller & Raber, 2008; Elbeshausen, 2007; Pawley, 1998);
- As embodied in spatial decisions that shape user capabilities (Capillé, 2018; Griffis, 2013;

Sequeiros, 2013; Van Slyck, 2001);

While few of these studies ask users what they think or test models against library users' lived experiences (Adkins & Hussey, 2006; Piper, Palmer & Xie, 2009; Ross, 2009, Widdersheim, 2018), some offer relevant models for understanding power relations in public libraries.

For example, Widdersheim's (2018) case study of a large library explores the its development and organizational decision-making power through the conditions of civil support, responsiveness, legitimacy, and resistance. He creates a testable model of system change based on political realities. Most notably, he finds that high resistance to change can be overcome, but that without significant political responsiveness, i.e. acting upon issues that have been discursively legitimated, then no development or change occurs in the library. In another example, Ross (2009) offers a model for how reading might empower readers, which takes into account the assumed agent of empowerment:

- Agent in charge (reader/text/political economic structure)
- Desired outcome of reading (pleasure/instruction)
- Effect of reading on the reader (beneficial/harmful)
- Process of learning to read (a natural developmental process/a specialized process for experts) (p. 654).

These models could be extrapolated to the case of makerspaces. More studies are needed to examine how or if the users who interact with the spaces are empowering themselves. Such studies might ask: How are the libraries facilitating the process of empowerment—through access to resources and/or some other ways; are the processes of creation the empowering factor; does the act of creating within the creative places benefit the user; and/or does the process of learning to use the spaces empower users? Correspondingly, the Widdersheim model could be used to explore how change does or does not occur with makerspace services, due to political realities in the library and/or community.

Public libraries express power in many less-explicit ways as well. "Resources are media through which power is exercised," says power theorist Anthony Giddens (1984, p. 16). These resources are allocated in accordance with the facilities, norms, and interpretive schemes of both

the organizational actors, and the users of the organization. In public libraries, the authorized tools, programs, and spaces reveal institutional priorities, for example. Interpretive schemes shape professional identities that in turn act as boundaries or warrants for decision making. I will not discuss all these potential power expressions here—they are beyond the scope of this literature review. I do give a brief overview of some of the key issues in public library institutional power in Appendix B. However, of the many library resources that I could discuss here—staff, programs, partnerships, trustees, etc.—I want to focus on three brief examples: The concept of the “people’s university,” including Reader’s Advisory Services and the Library Faith; the library building as a social space; and public library programs. I chose these three examples because public libraries since the earliest days of Boston Public Library have expressed tensions surrounding the popular and/or education provision of library services. Creative places/makerspaces are at their core a spatial arrangement, as well as a social one. And most public library creative places hold programs.

The People’s University

Public libraries as a tax-supported public institution began in the 1850s with the founding of the Boston Public Library. Originally these libraries were intended as “civilizing agents and objects of civic pride in a raw new country” (Molz & Dain, 1999, p. 3). Libraries became a cultural force in the United States. By 1876, Melvil Dewey began the organization of the American Library Association and conventions, library journals began publishing papers, and the US Department of Education began collecting library statistics (Ditzion, 1947; Garrison, 1979). Early libraries offered: “the best reading, for the largest number, at the least cost” (Dewey, 1906), along with quiet clean spaces in which to read and be assimilated into middle class American culture (Harris, 1972). Over the years, the focus of libraries has shifted, to some degree, from printed materials as the primary informational and cultural medium, to information media construed broadly, and to social space (Wiegand, 2015). This shift has not been uncontested: throughout history people have argued about which sorts of services should be supported by

libraries, (e.g. Molz, 1964, Ross, 1991, Dilevko and Magowan, 2007).

In the 1920s large libraries such as Chicago Public Library offered Reader's Bureau services, in which librarians would prescribe an individualized list of sequential readings to assist people in learning about particular socially significant topics, with the understanding that such learning in the "people's university" supported democracy (Ross, 1991). The "fiction problem," as Ross characterizes it, is that many people want to read fiction for fun instead. Reader's advisory services such as the Reader's Bureau were thus situated within points of contention: should public libraries serve "serious" educational goals, or more "frivolous" ones of enjoyment? Librarian power was at times enacted such that users were required to check out non-fiction books along with fiction ones. Some librarians were proud of any reduction in fiction circulation, due to their efforts to boost what they believed was worthier reading.

This version of the library faith, that libraries were serving as People's Universities with serious knowledge pursuit grounded in non-fiction reading, was challenged by the findings of the *Public Library Inquiry* series of studies in the late 1940s. Berelson (1949), in looking at *The Library's Public*, found that, of the few people using their local libraries regularly, fewer still were exploring the library in its "educational" role to further an autodidactic course of study. Rather, people enjoyed popular materials. He argued that it "may well be that the proper role of the public library is deliberately and consciously to serve the 'serious' and 'culturally alert' members of the community rather than attempt now to reach all the people." (p. 130). Berelson suggested a hierarchy of values to drive library services, with the first priority in reaching the "culturally alert" readers who were using the library for serious purposes. Meanwhile Garceau (1949), in his *The Public Library in the Political Process* volume of the *Public Library Inquiry*, said:

The social beliefs behind public library support: that every person should have an equal chance to fulfill his abilities: that every man can and will do so with given the chance: that the individual shall be free to develop as his inclinations and capacities guide him: and that society will progress as the enlightenment of its citizens advances" (pp. 12-13)

Nevertheless, "light" fiction reading was often situated by library staff and funders as a path

toward more serious reading. As Molz (1964) describes, “pleasure, and the implicit faith that reader, if properly guided, would gradually move upward casual, light reading into the more purposeful sphere known ‘the world of books’” (p.100).

In the 1990s, as digital resources abounded, libraries responded through offering computer labs and free Internet computers. However, these services began with similar interventionist views aimed at ensuring “The People’s University” was not too much fun. For example, in the United Kingdom, Muddiman et al. (2000) found that people were allowed to use these computers for “access to up-to-date information. It is the electronic extension of the reference library – not a replacement for the post office – so we are blocking out things like hot mail” (p. 141). Similar blocks occurred in the United States, where things like games and social media were blocked (Mon, 2011). In fact, some libraries prohibited, anything that involved the patron’s ability to contribute content in a Web 2.0 medium (Mon, 2011, p. 69). Librarians wondered, “Should a patron who wants to search the catalog or use a periodical database for research be forced to wait for hours while another patron plays a game of chess?” (Balas, 2004. p. 36), signaling their attempts to prioritize “correct” uses of these computers.

Greene’s (2021) book *The Promise of Access: Technology, Inequality, and the Political Economy of Hope* speaks to the access doctrine, as he terms it, in which:

The access doctrine decrees that the problem of poverty can be solved through the provision of new technologies and technical skills, giving those left out of the information economy the chance to catch up and compete. (p. 5)

This doctrine spells out the preferred ways that libraries and other institutions position access within a neoliberal² framing of professional skill building. Greene describes how the Clinton/Gore administration responded to newly privatized Internet technologies in the 1990s by offering limited public funding to libraries and schools. These funds were stopgap measures to reduce digital divides grounded in race and poverty. This access doctrine was founded on the imaginaire that access was, “the opportunity to compete in the New Economy, an opportunity

² Greene frames neoliberalism, “as a political project wherein an activist state repurposes its institutions to define and enforce citizenship around market demands” (p. 34).

independent of, but able to strategically mobilize, any individual digital technology” (p. 47).

Greene reports that public libraries grasped at this new mandate with alacrity, as it offered new opportunities for the library to signal relevance in a digitizing world. He goes on to describe the process by which libraries “bootstrap” to meet the access doctrine’s mandate:

Bootstrapping is the process of rapid organizational restructuring that occurs when public service organizations define the problem of poverty as a problem of technology and the skills to use it. Bootstrapping begins when public service organizations are faced with overwhelming problems, limited resources, and diminished legitimacy. They rapidly change their identity and operations to provide the people they serve with digital opportunities. (p. 61)

In his ethnographic work in the main library in Washington DC, he found this access doctrine reverberating through the technology provisions and programs. Users of technology were expected to use it for professional ends, while behaving professionally. Librarians and staff then enforced these unwritten codes of professionalism, prioritizing uses of the library’s computer lab and makerspace. The mostly unhoused, Black population who used the library’s computer lab every day were not visible in the makerspace, and the library strictly limited their activities in the computer lab to reduce play, collaboration, and rest³—much as earlier librarians tried to reduce the reading of fiction for pleasure. White “hipster” librarians, who resembled the workers from technology startups that the makerspace aimed to emulate, welcomed a younger, whiter crowd into the makerspace. The library faith in this library centered on expanding digital inclusion through access to technology, but that this access needed to be for professional ends of career-building and self-improvement.

The call for library makerspaces has emerged as a new version of a technological library faith, with roots in the same ground as earlier Reader’s Bureau and computer lab services. In this instantiation of the library faith, libraries are able to benefit society by providing access to technologically-advanced tools for people to self-train in economically-desirable skills, in a new

³ Public libraries have long had a troubled relationship with people sleeping, relaxing, or “loafing” in the building (c.f. McCrossen, 2006, Van Slyck, 1996).

form of People's University that is serious, hands-on, and centers on novelty. There are always new skills and technologies to master. In addition, a culture of innovation and entrepreneurialism is advocated, with creativity acting as a product/producer of jobs and economic stability.

Space/Place

Socially constructed space, or place, is power-laden (Certeau, 1984; Foucault, 1977; Giddens, 1984; Lefebvre, 1991). In planning and constructing a building, the physical realities of a space (i.e. topography, access to building materials) are mediated by social relations (priority decisions, the reason for building, the relations of the builders and planners, and so on). As Griffis (2013) notes, "library buildings are a form of information technology" (p. 1). Library spaces shape the possible actions and experience of those using it. Van Slyck (2007) elaborates:

A building's plan determines which interactions—with books, with library staff, with other users—are possible and which are impossible. The three-dimensional qualities of a building's interior spaces, as well as the furnishings and fittings within those spaces, constitute a sort of stage set that encourages users to play certain sanctioned roles, while making others seem unthinkable. (p. 221)

Leckie and Given (2010) invoke Lefebvre's spatial dialectics to describe the critical theory of social space in LIS in a book dedicated to the topic. Other scholars are using social capital theory to look at the ways libraries are used as spaces and the impacts these uses have (e.g. Aabø et al., 2010; Cox et al., 2000; Kleiman, 2008; Leckie & Hopkins, 2002). Several areas of study emerge that center on power. Some of these include discussion whether about certain activities are acceptable in library spaces (Agosto et al., 2015; Bernier et al., 2014; Given & Leckie, 2003; McCrossen, 2006; McKenzie et al., 2007; Rothbauer, 2007; Van Slyck, 2001); how space acts a facilitator of social capital or community engagement, often as a public sphere (Aabø & Audunson, 2012; Aabø et al., 2010; Alstad & Curry, 2003; Audunson, 2005; Audunson et al., 2011; Cilauro, 2015; Johnson & Griffis, 2009; Miller, 2014; Most, 2009; Vårheim, 2009, 2011); and the need of physical meeting spaces in an increasingly digital world, often as "third space," and as a vital component of library services (Begg, 2009; Brewster, 2014; Elmborg, 2011; Fisher et al.,

2007; Jochumsen, Rasmussen, et al., 2012; Lin et al., 2015; Rooney-Browne & McMenemy, 2010; Veil & Bishop, 2014).

Most pertinent for this research, two areas of research have emerged looking at public libraries as creative or co-working spaces (Bilandzic & Foth, 2013; Di Marino & Lapintie, 2015; Jochumsen, Rasmussen, et al., 2012; Slatter & Howard, 2013; Xin, 2006); and power and control as expressed through library spaces (Black, 2005; Dick, 2007; Griffis, 2013; Sequeiros, 2011). Of the works that engage with a user-centered perspective of library space impacts, the series of “PLACE” studies funded by the Norwegian government is exemplary. These studies interview users such as immigrants to explore how the space impacts social capital (Aabø, 2005; Aabø & Audunson, 2012; Aabø et al., 2010; Audunson, 2005; Audunson et al., 2011; Vårheim, 2009, 2011, 2014). These studies find that simple propinquity of the users within the space is not always enough to develop inclusion or a sense of social trust, much less social capital or a sense of power. However, they do find that users working together in groups in the library can build social capital, trust, and a sense of power.

A few studies of libraries as place are particularly relevant to this project. Black and Pepper (2012) offer an historical perspective on public library architecture, calling it architecture 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). They dispute the social domination school of thought regarding public libraries and their buildings. Instead, they argue, the buildings of public libraries are an example of Gramscian “social negotiation” in which the institution and its users share power (p. 452). In the modern era, “in open-plan environments, layout was defined by traffic flow rather than top-down determined functions and professional priorities” (p. 457), signaling an acceptance of user tactics into the institutional strategies of space.

Griffis (2013) explores how public libraries express importance, power and control; how users perceive and use spaces; and what they may do within them. He finds the territorial markings of furniture, counters, and walls in library spaces which, often subliminally, shape

feelings of belonging or exclusion in the “front” or “back” of the house, i.e. public and staff-only spaces. 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 in the space with panoptic emplacements of personnel desks, counters, and sightlines. He finds:

To some users, there is no “user territory” in a public library—if we define users as a group, rather than a series of individuals. From this perspective, it is arguable that 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)

Sequeiros (2011) also uses LeFebvrian spatial theory to explore user perceptions of institutional control and individual power in light of their social reading practices in public libraries. They find that not only the library staff, but other users, internalize and enact their versions of perceived policy, with some users hushing others. This study offers a doorway into the individual practices that structure the organization and the possible actions within it.

Mickiewicz (2016) finds that the librarian becomes “invisible” in a large library in Québec, with spatial arrangements that move library staff behind the scenes and replace them with “virtual librarian” technologies. She further finds that, despite the stated goals of openness in the design of the building, surveillance and architecture aimed at controlling the public restricts the actions of the users, that “the library still imposes its own set of conditions and rules of behavior” (p. 248). Capillé (2018) uses historical data to describe how public libraries express contradictory narratives of open access and social control through spatial arrangements: “public libraries’ spaces *embed* power relations. It is also evident that they *transmit* these power relations mainly through the presence of people in space, so as to organize and educate them” (p. 420). The findings of these studies challenge the rhetoric 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. They

felt surveilled, controlled, and separated from the rest of the community through spatial choices in the libraries.

Programs

Library programs are another resource enacting power. Libraries host many types of programs, including children's programs, book discussion groups, gaming and craft groups, and community reading programs. Informational and educational programs supply governmental, cultural, scientific, and local information to the library's stakeholders. Literacy training, from early childhood literacy programs to senior computer literacy programs, also occurs at many libraries.

The many articles, workshops, conferences, and websites aimed at supporting art and craft in public libraries is evidence of the widespread nature of such activities in practice (see *The Programming Librarian* at <https://programminglibrarian.org>, for example), but one will hardly know these events occur if one examines the scholarly literature. Programs and activities that focus more on social connections and/or intrinsic enjoyment are rarely mentioned in the research literature, aside from literacy and technical benefits, though they are a central effort of the professional literature. Recent efforts have begun to gather research evidence to either question or justify the public funding of them, (Barchas-Lichtenstein et al., 2019; Cahill et al., 2020a; VanScoy et al., 2020).

Of the little research done on creative programs, most of it is aimed at assessing whether the programs were instrumental for furthering literacy skills or educational goals (Aguilera, 2018; Koh, 2013; Lopatovska et al., 2018; Lopatovska et al., 2016; Noh, 2017; VanScoy et al., 2020; Willett, 2018). These social goals support versions of the library faith imaginaire, such as civic engagement or in training literacy or technical skills. While these activities can be considered informational, educational, and/or literacy-based, from the perspective of the patron, they may not be aimed toward any larger social goal than play, creation, or community-building. The instrumentalities venerated by librarianship may not be valuable to the patron.

In one study, a national summary of the impact of library programming concentrated on the library's perspectives on what programs were doing, and for whom (Barchas-Lichtenstein et al., 2019; Barchas-Lichtenstein et al., 2020). No users were asked to assess the programs or their value or impacts. The summary began the process of categorizing what sorts of library programs exist, and found the outcomes of the programs are assumed to assist people to: learn new knowledge or skills, change attitudes or behaviors, to become aware of library resources, build stronger/healthier communities and to “have fun or [be] inspired”—the latter of which was a “surprise” finding that the authors did not expect (Barchas-Lichtenstein et al., 2020, p. 575). Similarly attempting to create an ontology of library programs, Mathiasson and Jochumsen (2020) find that:

the roles and functions of public library programs can be understood as a continuum between a program serving as a means to an end (e.g., the dissemination of the collections) and a program serving as an end in itself (e.g., as social interactions). (p. 375)

Such studies are no doubt helpful for librarians; they offer lists of competencies to develop and strategies to consider in developing programming. However, they do not address the needs of the users face to face, instead relying on librarians to interpret what people want and why.

Few studies have asked the users what they value in the programs they attend. Cahill, Joo, Howard and Walker (2020a) is one example of a user-centered study of programs. In examining family motives to attend library storytimes, the researchers find that the primary reasons revolve around social interaction and fun, with the majority of the respondents selecting those reasons to attend, rather than for literacy or learning. Cahill et al. (2020b) also examine what library directors think is valuable about storytimes, as well as what text sources are used or needed in them, and how early learning occurs within them. Administrators focus on learning, literacy, growing lifelong library users and making children aware of the library as the primary reasons to hold them. Social interactions for children and caretakers arise as fifth and seventh, respectively, on the list of the director's reasons for storytimes. “Fun” does not appear on the list at all (Cahill et al., 2020b, p. 1004). The different goals the patrons had from the library administrators

illustrates one reason it is so important to solicit the user's perspectives on library programs and services.

Outside of LIS scholarship, sociology scholars are examining why people value or attend creative library programs. For example, Robinson's (2020) ethnography explores a library knitting group to find that:

while the library's semi-curation of the knitting group created a space for a more diffuse and unspectacular manifestation of multiculturalism, the institutional perspective of the knitting group's ordinariness left little room to value the group as a multicultural space. (p. 568)

Robinson notes that the development of vulnerability, a sense of belonging, and multicultural identities do support the library's strategies for community building and social inclusion, but that such activities are often unrecognized or trivialized.

Federal-level decisions to fund library "learning spaces," in which the *learning* often occurs through interactive making or doing (IMLS, 2012a, 2014a; Marx, 2014), reveals the importance federal agencies place on these programs. Nevertheless, stakeholders interested in *making* information or objects are not well-represented in the LIS research literature, or in this policy. Nor are the people who attend the programs. The lack of research on public library programs is worrying given the enormous increase in use of these programs: 93 million people attended some type of program at a US public library in 2012, an increase of 37.6% since eight years before (Wiegand, 2015a, p. 2). This trend has continued: "119 million people participated in 5.4 million programs in 2017, up from 113 million people and 5.2 million programs just 1 year earlier" (Barchas-Lichtenstein et al., 2020, p. 563). This dissertation research addresses this gap by exploring patron perceptions of the impacts of creative programs and services offered by public libraries.

This discussion of public library power expressions is by no means comprehensive—even including the discussion in Appendix B—but helps to situate the role of the library as the institution making the rules and determining access for their communities, in an environment of tight budgets, limited resources, and market pressures to "remain relevant" by providing

makerspace services (c.f. Apodaca, 2017; Enis, 2012; Lui, 2016; Willett, 2016).

Public Library Makerspaces

Alongside library faith imaginaires, the reasons for public library creative places also emanate from larger discussions of making and “The Maker Movement”. The Maker Movement emerged from Do-It-Yourself (DIY) culture and from the inception of Make Magazine in 2005 (Gorbatai & Dioun, 2014; Maxigas, 2012; Papavlasopoulou et al., 2017; Sivek, 2011). Discussion of public library makerspaces has filled the pages of professional library journals in the last decade. These discussions echo through academic journals, professional and academic conferences, webinars, and government agency narratives (e.g. “AASL programming @ ALA,” 2012; Adler, 2012; ALA, 2012; ALISE, 2016; Brady et al., 2014; IMLS, 2014a; Koh & Abbas, 2015; Scott, 2012). These articles describe a library makerspace imaginaire that focuses on Science, Technology, Engineering and Math (which sometimes include Art: STEM/STEAM) skills, innovation, entrepreneurialism, collaboration, and learning. Authors of these articles often link traditional library faith imaginaires and library values to making, as in Sarah Hashemi Scott’s (2012) explanation of why these spaces fit with the public library mission. Scott traces the library faith’s lineage from the facilitation of knowledge creation and literacy, to transliteracy (“the ability to read, write and interact across a range of platforms and tools”), to the need for technological literacies and access to advanced tools of fabrication, and concludes, “Our job now becomes providing access to new technologies and instruction to support new literacies” (para. 2).⁴

In the early years of library makerspace development, practitioners could find information on how and why to implement makerspaces in webinars, conferences, and the professional literature (ALA, 2012, 2013; Bagley, 2014; Britton, 2012a; Britton & Considine, 2012;

⁴ Greene (2021) critiques this access doctrine, which internalizes neoliberal framings of work and forces libraries to marshal dwindling resources to meet needs for human development in an attempt to claim institutional legitimacy and relevance. He further points out the problem with preparing people for technological jobs that do not exist, due to globalization and the processes of capitalism in general.

Burke, 2014; IMLS, 2014c, n.d.-b). Moreover, grants funded by the Institute of Museum and Library Services (IMLS) and the MacArthur grant in 2011 spurred the creation of 24 library and museum makerspaces. These spaces were aimed at youth and intended to:

prepare youth to meet the challenges of a complex global economy and gain the skills they need to succeed in a rapidly changing world...[using Connected] learning that is interest-driven, socially relevant, and aimed at expanding educational or economic opportunity. (IMLS, 2014b, p. 4)

Each library and museum received \$100,00 to implement these spaces, and there was support from IMLS in planning the spaces around Mimi Ito et al's (2009) research about how teens hang out and learn informally. Some of the funded initiatives focused on ensuring teens could have a say in the planning process of the spaces. A second round of IMLS funding called "Making + Learning" started in 2017.

These grants included resources such as Massively Open Online Courses, digital toolkits for supporting learning in the spaces, and roundtable events. There were clear entrepreneurial signals throughout the grant materials and reports, such as: "Youth will be ready for jobs with the emerging tech startups that have followed Google Fiber to the city" (IMLS, 2014b, p. 7). The IMLS aimed other federal grants from IMLS, such as a \$249,000 Chicago grant, at "mentor-led learning and will introduce adults, families, teens, and children to technology and equipment that is enabling new forms of personal manufacturing and business opportunities" (IMLS, 2012b).

A Focus on Learning

These learning-centered IMLS grants shifted librarians' perceptions of their work, with a teen services director reporting that, "Because of this experience, for the first time I think of myself as an educator" (IMLS, 2014b, p. 14). Many LIS scholars appear to agree with the IMLS perspective that making activities in libraries primarily exist to support support learning. These scholars often term the people using public library makerspaces as "learners" instead of "makers" or another term (e.g. Bowler et al., 2019; Halverson et al., 2017; Kessner et al., 2021; Kim &

Copeland, 2021). Koh and Abbas (2015) also frame library makerspaces as “learning spaces” and teens as “learners” rather than makers, but they also discuss the competencies for library staff to develop a teen makerspace community and services in a library. They determine that staff need to be culturally competent, flexible, and have the ability to trust the abilities and agency of the users. They highlight the library staff’s ability to learn, adapt to changing situations, collaborate, advocate for the makerspace, and to serve diverse people as key to successful makerspace implementations.

While my focus in this study is not on the specific processes of learning, the paths toward sense-making and understanding are power expressions, and realized through power relationships. For example, Einarsson and Hertzum (2019) establish processes that scaffold learning in public library makerspaces in six libraries in Denmark, and describe information practices in the spaces. Einarsson and Hertzum observed users and did interviews of staff members, and elucidate concerns about more structured activities and the shaping or stifling of user creativity. They find that some users found little value in the structured learning opportunities. However, for many users scaffolding was needed from the staff or formal learning experiences to support their user-initiated projects. The community interactions in this space helped users formulate ideas, pursue ideas, problem solve, and enjoy the social making process. The researchers also found that:

Mass production is prohibited in most library makerspace due to unfair competition with local printing shops and because it is incompatible with the learning objective that legitimizes the library makerspaces: “*We call it entry-level or learning makerspace. There you can only make prototypes*” (Einarsson & Hertzum, 2019, pp. section 4.3, para. 3, italics in original)

While centering makerspace use within learning, Einarsson and Hertzum offer principles for assisting design of learning opportunities in makerspaces, including accepting that there are diverse entry/end points for different users and a need to encourage sharing and documentation.

In a later study working with 13 library makers in 5 Danish libraries, Einarsson and Hertzum (2021) invoke the concept of *serious leisure*—“an uncoercive hobby activity that

requires special skills and knowledge” (“Process and situation receive little attention” section, para. 2). They explore how the makers use and locate information during projects that are often more about fun than a finished product. They find that trial-and error experimentation and speaking to other users of the makerspace are the two main ways in which information is gathered. They also found that not all of the people using the space felt comfortable with the other users. In what was an interesting side note in Einarsson and Hertzum’s (2021) study—but which is central to this dissertation—this study identified diverse reasons for using the makerspace, many of which were not about learning. For example:

[Eva] has enjoyed the creative process, but her objective is neither the fun of it, nor to display the product to others. For Eva, making the table has been about removing an annoyance in her everyday life. (“Eva’s folding table (“experimentation”)” section, para. 2)

For some of the makers, the space was about the tools and products they could create, but for others, “taking part in the makerspace community is as important as seeing their personal makerspace projects through to completion” (“Ease and pleasure are the dominant relevance criteria” section, para. 2). For Eva, it was to create a useful product that solved a problem.

VanScoy, Thomson, & Hartel (2020) do not focus on makerspaces, but touch on them in their discussion of library programs, which are little-studied in the LIS literature. They also use the serious leisure model developed by Stebbins, differentiating serious leisure from casual leisure. Casual leisure activities require no particular training and are immediately pleasurable activities, project-based leisure is about one-off projects, which may require significant skill, and serious leisure involves dedicated skill building, is substantial and fulfilling enough to be considered a central life interest. They do a content analysis of public library program descriptions in four large libraries, to determine what sorts of leisure were supported by each program. In their study, they call for a focus on serious leisure activities, even though they code most public library programs as supporting casual leisure (and those activities could also support all types of serious leisure). These researchers do not discount the value of casual leisure, considering it a way to bring together diverse types of people. However, say that other

organizations can take care of a community's casual needs, perhaps unaware of the limited options in small or rural communities. In stating that a library is "a citadel for knowledge" (p. 6) that exists to support "learning and knowledge acquisition—arguably, the *raison d'être* of the library" (p. 6), they propose to narrow the purposes to which library programs should be put.

Kim and Copeland (2021) look at rural library creative places to determine how these libraries approached learning and providing maker resources. They find that the smaller libraries focus more on the attendance at programs rather than the community building and collaboration that they say mark larger libraries and other makerspaces' programs. In addition, they find that the programs do not always align with the interests of teens, nor do teens have a say in what library actors make available as programs or resources. The library staff suffer from a lack of the STEM-based skills they believe they need to teach teens, and some librarians situate themselves dispositionally as NOT the type of people who do STEM-based activities.

Pijls et al. (2022) focus on makerspace "coaches" who assist children after school in Dutch public library makerspaces. They interviewed 27 children and six coaches and found that building bonds with children, teaching, balancing structure and freedom, learning how much activity is the right amount, and undesirable behavior are central to the coaching experience. Collaboration was not always encouraged in these programs, though some coaches consider it a social norm in making. The coaches believed that children developed perseverance, as well as STEM skills, and the children reflected those ideas. Children further stated that the makerspace was fun, though school was boring, and that they felt "free to do what I want" ("Results" section, para. 5).

Xiaofeng Li and her co-authors have focused on information practices as well as learning in library makerspace contexts. Using Savolainen's model of Everyday Life Information Seeking and Dervin's theory of sense-making to ground their work, and field observations and qualitative analysis, Li and Todd (2016a) were the first LIS researchers to publish research grounded in user experiences. They examined how children made sense of 3D modeling activities in the library. They found that young makers preferred to iterate trial-and-error processes of figuring out their

projects. They also learned from one another. Li and Todd (2019) used interviews, focus groups, observation, and photovoice, in which participants take photos of the space/activities and describe them, to understand youth practices in a public library and school library makerspace. These were largely male participants (3 female, 21 male) and they were regular users of the makerspaces. The researchers found that the preferred outcomes of using the space equally centered around enjoyment and construction of projects, as well as STEM knowledge (p. 321). These young makers wanted to make. For them, learning was valuable and necessary, but it was less a reason to be in the space than it was an outcome of using it. Although, some children did focus on learning, such as two boys who sought to develop their leadership skills. Quite a few of the participants also identified being exposed to new interests or ideas as valuable. Many wished to hang out and create with friends, as a social activity.

Li's (2021) further work on youth information practices in library makerspaces used interviews with Critical Incident Technique, focus groups, observation, and photovoice. She further established that a friendly social atmosphere generated a culture of people comfortable asking for help. Youth used their bodies to sense how things worked through experimentation (such as licking a battery) and were happy to tinker without fear of failure. One girl noted, "Just keep trying and then if I can't get it like the 10th time, then I might ask for help but I'm kinda person that likes to figure things out by myself" (p. 751). The factors youth used in choosing what information to value or use was based on perceived expertise, perceived authority, collective wisdom, firsthand experience, and proximity (i.e. asking those nearby). The participants stated that they felt good about sharing and helping one another.

Lee et al. (2018) also focus on learning, using design-based research to map out how four school libraries and two public libraries—all small and rural—are supporting learning through makerspace services. They find that many demands on librarian time mean that programming and development of makerspace often is fit in wherever possible and is *ad hoc*, which limits librarians' ability to plan structured programs. More structured programs are not well-attended. Instead, "low threshold entry-level activities" ("The second conjecture map" section, para. 1)

might be more attainable, for staff and youth alike, in part because they can decentralize librarian expertise. The children in these spaces generally do not know what to make, so themed activities help, though the researchers state that more youth investment in designing those activities will be beneficial. They also find that teens prefer social learning through imitation over engagement with training materials—through a domino effect occurs wherein the first child that uses the prepared training material allows later children to imitate them. In this study the criterion for a successful program or initiative varies from “quietly working on projects” to “lively engagement,” based on each librarian’s internalized view of what library work should look like.

Few of the pre-2016 studies are grounded in sufficient conceptual or theoretical depth to inquire about power expressions, though some offer insights. Fewer still speak to users to inquire about their experiences. Gierdowski et al. (2015) do use a theoretical framework. They describe a mobile makerspace experiment, and link the case to cognitive theories of social learning. However, the authors never explore the theory of social learning in light of their case. Instead, much of the article describes the top-down librarian decisions about the materials included in the mobile makerspace.

If any user feedback is reported in the early case studies, it is scant, or does not speak directly to the participants. In one case study, a founder of a mobile makerspace said, “The educators and other grown-ups with whom we interact always report how powerful it is to see their kids so engaged in our activities and enjoying what they’re doing” (Moorefield-Lang et al., 2015, p. 468). In another, only parents were asked about children’s experiences (Roberson, 2015). The focus upon what adults see or believe sidelines the children’s participatory experiences. These case studies are institution-centered. They rarely describe convivial social relations. For example, Peltonen and Wickström (2014) described their public library makerspace activities: “The tasks given are often not only for learning, but we aim for user created content that is somehow useful for the library” (p. 3). This quote delineates a power relationship of this Finnish library makerspace: In this instance, users of the library may not choose their tasks or the uses to which they are put.

These scholars have framed library makerspaces as “learning spaces” and focus on the ability to help children to learn. In doing so, some scholars sideline making for reasons other than learning, or other valuable ends people might seek in makerspace. Nevertheless, nearly all of these studies emphasize collaboration as a method of learning, and several of these studies point out other reasons for people to use makerspaces.

Other Outcomes and Goals

After I began collecting and analyzing data in 2016, studies have begun to emerge that explore non-learning-centered outcomes and goals of these creative places. In a study also examining learning in library makerspaces, Skåland et al. (2020) focus on user-centered understandings of invention in these spaces. They interviewed and observed school children in an Oslo public library creative place over the course of seven months. These students, aged 10-12, were accompanied by teachers and placed in structured activities centered on invention. They find some children resisting the structure, to explore forms of creation other than they are being instructed to follow. When the library instructor informs children they have to invent something new, in 40 minutes, the children create both an object and a story to inform the authority figure that they have indeed made something new (a Morse code signaller). The instructor then reframes their story into something else to emphasize the “newness” of their invention (p. 169). The researchers point out that the power enactment of the library instructor’s reframing of the children’s invention as something of necessity “new” is a form of potential disempowerment for these children. They further note that such authoritative reframings and strictly structured programs may become “too much like school” (p. 170), and limit power for the children who use the spaces. These researchers are pushing back against a controlled “learning” modality in makerspaces to see a larger picture of what children might gain in using the spaces: social equity, creativity, exploration, and agency.

To contrast with the more learning-centered and information-focused research on library making, Worsley and Roby (2021) focus on Black joy. While this critical ethnography focuses on

Black youth in two Boys and Girls Club makerspaces, its lessons are valuable in considering those in public libraries. The researchers critique the interventionist narratives of makerspaces that do not assign agency and skills to young Black people:

Within the last decade, minoritized youth, who have been the focus of a wide range of maker intervention programs, and yet have been positioned as novice/outsider in need of being mentored into making through deficit lens and lack of acknowledgment of their cultural wealth. (p. 119)

Much like Skåland et al., they note that there are structural inequities and oppression in these makerspaces, such as when a computer program does not allow makers to change an avatar's skin from white to brown. Two young girls used a facilitator's assistance in recreating these characters from photographs, in response to this racist limitation. In another instance, one's family and name were centered in a making project, which provided "making as a freedom practice with family provides unique opportunities for creativity and a love ethic" (p. 129). The freedom the youth had to co-construct the making practices in these spaces was read as liberatory in the face of anti-Black oppression. This article is one of the few that provides non-learning-based goals and outcomes for children using makerspaces.

Teasdale (2020) offers some metrics to evaluate successful implementation of library makerspaces. She notes that defining success is a challenge, given the diverse nature of these places, that learning and literacies ground this success, but also that public libraries' democratic and access missions require them to support a variety of user goals. She highlights the need for patron self-determination in making, and the "the importance of understanding makers' desired ends, which requires investigation of the varying making-related values and goals within communities" (p.2). In contrast, she noted, less democratic assessments privilege the institutional actors as opposed to "program participants (and other less-powerful stakeholders" (p.3). She researched the definitions of success that the makers themselves invoked in one public library, spending nine hours observing the users, then interviewing 22 makers and 14 staff members, analyzing documents, and using a card sort activity for makers to prioritize their goals in using the space. She also asked the makers to compare the library's goals in

providing the space with their own goals. Teasdale found that the 3 primary library goals—providing access, supporting entrepreneurial opportunities, and nurturing creativity—were all valued by the makers. They further expressed goals such as strengthening their communities and families, deriving intrinsic benefits from making (i.e. fun), and saving money. Teasdale was careful to point out that the subsequent seven criterion for success may not be relevant in all cases. For example, 55% of the participants valued entrepreneurial opportunities, but the other 45% found those irrelevant. Thus any assessment must reflect the goals and outcomes sought by the users in a community. She highlights a convivial tool-mindset (without ever using this concept) by:

identifying the criteria that were relevant to each participant and applying those specific criteria to data collected from that individual. In doing so, individualized evaluative criteria could help evaluators examine how the makerspace supports individuals in achieving their goals. (p. 8)

In other words, the tool of the makerspace must forward the power to decide how, when and for which purposes a tool is used to the user, and that should be how the tool is then assessed. Teasdale states that to apply only the library's criterion for "success" would limit equity and inclusion. This study is thus far the most comprehensive user-centered study that focuses on *power* (without leveraging that term) for the user to meet their own needs in a makerspace.

Lee and Ocepek (2022) offer another perspective on making and libraries (though not makerspaces), by interviewing and using diaries of crafters and exploring how they use libraries to support their craft. They found that the participants were willing to lead workshops at the library, thought that libraries would be a good place to build craft communities, and that some felt that libraries needed to be more socially interactive. Some described the makerspaces they would like to see in libraries:

I long for libraries to be like, Town Square, that's what I long for. [...] Not that there isn't a quiet space, but there's also this big space where people can have a cup of coffee and meet new people and work on projects.... I want that to be attached to my library. ... What I need is a space where other people are creating things because then if you didn't know how to do something, the library is right

there for you to look it up. [...]Wouldn't it be great if I could check out the time of someone who does photo transfers in the library space and have them teach me how to do photo transfers properly? (p. 236)

Many of the makers interviewed in this study used the library to check out materials, including tools, but they wanted a more social space to engage with other makers, to learn, and to use larger spaces to pursue their craft.

Throughout the book *Reconceptualizing Libraries: Perspectives from the Information and Learning Sciences*, edited by Lee and Phillips, case studies explore different reasons for making programs and outcomes of their implementation. Phillips et al. (2018) described librarians in these spaces as “experience engineers” that provide user-centered experiences, as long as librarians can manage their worry about risk. Kafai et al. (2018) found that a youth project of interconnected circuit board messages in a mural built a sense of community engagement, as well as technical expertise. Tzou et al. (2018) found that family memories and meaning were shared and build equity. They also focused upon power-sharing between the community organizations that partnered in this project. Through their participatory design research and collaborations, they found that the TechTales project they worked on spurred deep learning. In a chapter synthesizing LIS findings on library makerspaces, Koh et al. (2018) focus on community engagement in library makerspaces. Invoking theories of Library-as-place, radical change, new librarianship, and communities of practice, they refer to two case studies to see how communities are interacting with these spaces, whether they are geographic or practice-based. They state that the library's commitment to access, equity, diversity, and “as community anchors” (p. 31) positions them uniquely to develop the social role of makerspaces in the communities they serve. They also point out that the sense of community, or value people find in it, will vary from place to place and person to person, that there are “potentially competing perspectives of community within the makerspace” (p. 33).

Principles and Protocols

To drive the development of public library creative places, many LIS articles and research

papers have focused on the “how to” and case descriptions of successful makerspaces. Some of these establish heuristics for people to better develop these spaces. Early case studies describe the implementation of such creative places and affiliated programs in libraries (e.g. de Boer et al., 2015; Gierdowski et al., 2015; Holt, 2008; Moorefield-Lang & Seadle, 2014; Moorefield-Lang et al., 2015; Peltonen & Wickström, 2014; Roberson, 2015; Sheridan et al., 2014). For example, Burke’s how-to guide to makerspaces contains statistics from an informal survey on how librarians have implemented their services. The Library of Congress has released a report concerning a survey on 3D printing in libraries (Primary Research Group, 2014), though printing is one small aspect of library makerspace services. Brady et al. (2014) focus on making makerspace-type programs accessible for those with cognitive and visual impairments, linking concrete suggestions of how to arrange materials and spaces with a reminder of LIS’s access mandate. This case study of a makerspace “event” is one of the only pre-2016 studies that critically engages with the idea of such services and issues of social exclusion, though from a theoretical perspective.

Interview or survey-based research studies, or literature reviews of earlier works, have looked at aspects of makerspace services, such as 3D printing and associated costs and policies (Crumpton, 2015; Massis, 2013; Primary Research Group, 2014; Pryor, 2014). Other studies described the competencies needed by—and acculturation afforded to—library personnel through making or makerspaces, either as a normative set of competencies based on the authors’ experience, or by interviewing practitioners (Bowler, 2014; Filar Williams & Folkman, 2017; Koh & Abbas, 2015; Parham et al., 2014). Moorefield-Lang (2015a) interviewed twelve librarians involved with such spaces in schools and libraries, which focused on training and integrating the spaces into the larger context of library services. She found that training, for both users and library staff, was a major concern. Slatter and Howard (2013) interviewed three providers or developers of Australian library makerspaces to see what patterns of advice and experience emerged, and found that there were concerns about raising awareness, advocating for makerspace services, and that the library workers were enjoying the challenge of developing these

services.

Moorefield-Lang's (2015b) content analysis of 24 user agreements described the need for research on policy related to library makerspaces, and explores the rules and restrictions found in the agreements. She found that, aside from rules, the policies provided "an avenue of understanding for library users" (p. 367), but did not empirically assess this understanding. She found several barriers to access based on age, intended use, and cost. This study opened the door toward understanding how policy impacts the users' ability to use a library creative place as a convivial tool, which Teasdale (2020, discussed below) has begun to answer, and this study will continue to address.

Later studies begin to synthesize these case studies or to develop models of how the public library makerspaces function—or should function. A "state of the research" report regarding makerspaces has further explored best practices or themes in the library literature. Mersand (2021) takes a wide approach, examining the literature spanning all types of makerspaces, including those in public libraries. They found that scaffolding of learning is required, that facilitators of the spaces may need specialized training, that community-building in the space appears to impact the use, that no studies have examined how rules impact outcomes in the spaces. They also found that few studies examined non-digital fabrication.

Kim et al. (2020) reviewed the library makerspace literature to establish best practices for transforming making programs to online settings during the COVID-19 pandemic. They offered several design principles for creating a maker Community of Practice, including facilitating "shared, interest-driven purpose..[and] 'hanging out' conversations first" (p. 121). They also emphasized the maker mindset of considering mistakes as drafts, showcasing the items that people created, and providing iterative structured feedback. They emphasized the need for collective goals and a focus on community-building.

Cun et al. (2019) offer an assessment framework for successful library makerspaces, which is quite different from Teasdale's (2020). Cun et al. understand these places in ways that align with the narratives often invoked in the makerspace literature, that anyone can do anything:

There are no restrictions for participants who visit library makerspaces. Being free, with access to all, any assessments must contend with the premise that anyone could be making anything for any amount of time in a library makerspace. (p. 40)

The authors delineate a complex model of self-assessment, patron assessments, library assessments, and in the end call for librarian observations, surveys, visitor logs, formalized self-assessments and one-on-one sessions with patrons. This assessment matrix is aimed at ensuring learning is occurring, but also at ensuring library resources are meeting the needs of patrons. This matrix of assessments takes user desires into account, but does not engage as deeply with them as Teasdale.

In many of the above studies, the findings offer examples of makerspace best practices, often from the perspective of practitioners rather than users. These research studies are often ontological in nature; they describe the phenomenon of library makerspaces, attempting to demarcate what these spaces are and what they mean for those who provide them. The standout studies, such as those by Teasdale (2020), Skåland et al. (2020), Einarsson and Hertzum (2021), and Li and Todd (2019) start to delineate issues of power.

Power and Public Library Makerspaces

Few studies yet flesh out the user-centered perceptions of power and agency within the context of public libraries. A few others explicitly ask questions about power (Adkins & Hussey, 2006; Griffis, 2013; Layzell Ward, 2002; Marshall & Melo, 2020; Melo, 2018, 2020; Piper et al., 2009). Prior to this study's inception in 2016, no studies had investigated which of the modes of power that the users themselves have determined to be most valuable: civic engagement, economic mobility, community resilience, social justice, learning, self-expression, the ability to take in and create ideas and objects, and so on. Since then, studies such as Teasdale's (2020) have begun to address these issues, but still without directly confronting power expressions. Maggie Melo's (2020) work has confronted issues of power—but not in public libraries. To help to fill this gap, this study explores issues of power in makerspaces, including what power users do have—and know they have—and what they cannot do, as well as how, why, and by whom power

is expressed in these spaces. While there is a growing body of research starting to address some of these issues, none of them address them all, or do so from a user-centered perspective.

The studies that have considered user perspectives in these places have begun to establish the educational and social impacts of such spaces on children and those that serve them (Lui, 2016), and the informational and sense-making practices of teens in library makerspaces (Li & Todd, 2016b; Lopatovska et al., 2016). They have considered the questions that teen makers ask themselves as they make things, and situates these questions in the area of critical technical practices and literacies (Bowler & Champagne, 2016). Investigations of power are an emerging research trend in the context of public library makerspaces, reflecting the fact that many organizations, the professional literature, and scholarly works all emphasize that the spaces are considered empowering. This is a new area of study.

Some studies have explored issues of expertise, legitimized authority, and democratization in making and barriers to widespread participation for adults in library and private spaces, though few involve the use or users of spaces or services (Boeva & Foster, 2016; Lakind, 2017; Teasdale, 2020; Tzou et al., 2018; Whyte, 2016; Willett, 2018). Each of these studies provides an important entryway into this new area of study, and helps to establish its boundaries and core topics of interest. All of the studies mentioned above have been published in the time after I had already collected data for this study, and most find similar issues to those I will demonstrate in the findings chapters. Prior to my data collection in 2016, no studies had investigated user perspectives at all, except for when Bilandzic and his research team planned a program to assist users in determining what was occurring or possible in a space (Bilandzic & Foth, 2013, 2014; Bilandzic & Johnson, 2013; Bilandzic et al., 2013).

Bilandzic and his team (Bilandzic, 2010, 2013; Bilandzic & Foth, 2013, 2014; Bilandzic & Johnson, 2013; Bilandzic et al., 2013), interviewed library creative place users, to ascertain the usability of the space when mediated by collaboration software. Bilandzic's work comes from an Human-Computer Interaction and Computer-Supported Cooperative Work background, but is implemented in public libraries. His work describes the social connections necessary for co-

working and making in shared public spaces, and the technical and spatial systems necessary to improve those connections. Through multiple ethnographic studies, he finds that, while “social and connected learning, on the other hand, is a bottom-up phenomenon, which cannot be externally imposed... spaces can be designed to facilitate organic growth and nourish a connected learning community” (Bilandzic, 2013, p. 17). These studies take a glance at power and how it is expressed in the practice of users of the spaces. They describe some of the power as capabilities to accomplish particular goals, as set by the users.

Collaborative making is a theme in the literature. In a small study involving six library patrons and some participant observation in a library makerspace, Whyte (2016) seeks to understand how they use space, and how the library restricts what they do. However, she finds less of an emphasis on these issues than on playfulness, collegiality and discovery. She finds that participants in library creative workshops resist making the objects they are “supposed” to make, that instead they focus on discovering how the tools can be adapted to their needs. The theme of collegiality that emerges from her data speaks to how people interact in the space, brainstorming together and admiring one another’s work. Parham et al. (2014) describe their participatory critical making project with librarians learning to work with Raspberry Pi computers. As they made a project, they found that:

The most significant technology in makerspaces is the ethos of sharing: sharing ideas, sharing skills, sharing materials. Creating ... was a profoundly social experience. (p. 3)

Koh et al. (2018) take a similarly collaborative view. They use radical change and communities of practice (CoP) theory to describe how and why community engagement should be a central aim of library makerspaces. They focus on learning, but not as an end-in-itself, or only as a tool for assisting social mobility. They also center social equity as a driving force for the learning and making. They present a few cases to illustrate the need for education in MLIS programs for makerspace development. They note the competing narratives about what the spaces are for or what community looks like. Though they nod to the idea that the users of the

spaces might have ideas about this, they then emphasize that LIS students need to be educated to ensure they have clear goals for offering makerspace services that are grounded in an institution-centered perspective: “building and maintaining partnerships with organizations in the community that can support the makerspace in various ways... a way to engage with new community members who typically do not use the library and/or to support participants’ activities in their own CoPs... a way to garner support for increasing participation and sustaining or funding a makerspace” (p. 33). The participants’ communities of practice’s are mentioned, but there is little further to suggest that the users’ various goals should be supported. Notably, this is one of the articles that establishes the users of the space not as creators, makers, or even simply users; instead they are “learners.” This piece situates the library faith as educational and spins the activities as providing learning.

Boeva and Foster (2016) state that power was spurred through discussions with library makerspace users. The report of their study is reticent about their methodology, how many participants were involved, or any of the other details of their study. They speak theoretically of users of the creative places or programs, and consider what forms a presumed empowerment takes in relation to these spaces, as well as the processes of empowerment, or the distribution of power. They explore the concept of empowerment in light of the permeable boundaries between being an expert and an amateur, and determine that the oft-touted democratization of making masked power relationships in which experts could express more power than amateurs.

Lui (2016) touches on issues of power in her dissertation research. Using Certeau’s practice theory, she describes how library administrators have both *strategies*, or organizational goals and methods to meet them, and *tactics*, or ad hoc responses to existing power structures. For example, a hiring freeze by the city forced an administrator to create temporary positions to staff a makerspace, using informal tactics of shuffling around budgets, and re-labelling jobs to meet city and grant requirements. And a strategy of the library actors—the people she interviews—Lui finds, is to appropriate the concept of the Maker Movement itself in a series of rhetorical moves that Lui calls “hustling” and “spin.” Some of this spin occurs through a

governmental attempt to introduce “legibility,” a term James Scott (2008a) uses to describe the state’s desire to improve society through “certain forms of knowledge and control require a narrowing of vision” (p. 11). In Lui’s research, this legibility is developed through appropriating some activities that fit with overarching social narratives, while others are discarded.

The processes of spin can positively develop a sense of self relative to maker culture, Lui (2016) states. In one example, Lui finds some children marginalized due to their age during a live broadcast of some activities. These programs were determined to be only for older children, by the MakerCamp organization, but the library welcomed the younger children’s participation up to the date of the broadcast, then marginalized their participation. The librarian then spun the practice of inclusion to appear more in alignment with the other organization’s focus on teens. Lui does not inquire directly of the kids to see how they felt about this. Instead, she observes and extrapolates their feelings from her understanding of what was occurring. She says the children sulked or felt left out. She finds some negotiation are necessary to incorporate varied goals during maker programming, in which some children are more interested in things that the staff do not expect, and they have to accommodate those interests on the fly, though staff sometimes label this, “controlling chaos” (p. 189). It would be instructive to see if the participants of these programs express feeling controlled, or supported, or something else entirely. This is a consistent gap in the library research—rarely do researchers who speak to users ask what the users think about their power or status in relation to the library.

Several studies examine an arts-focused makerspace in Madison, Wisconsin, called The Bubbler (Bubbler, n.d.). This makerspace is not an at-will space in which people come and use shared tools as much as it is a program space, with artists-in-residence, exhibitions, popup programs in branch libraries, and various programs providing mentorship, training, and co-making activities. Lakind (2017) delves into issues of neoliberal framings of education in The Bubbler. While she interviews only librarians in this study, she also analyzes data gathered through participant observation in the space and programs. She finds that there is a spectrum of

understanding the reasons for these spaces and programs that flow from *learning* to *making* and back again. *Learning* is social and involved self-realization, and is ongoing and process-oriented. *Making* is more about skills, careers, and products, and is more individual. The tools and activities, when framed as *making*, are not about socially connecting or developing a new sense of self or disposition, as much as they are about creating a product. The making orientation fit with a neoliberal view in which art production must be instrumental for jobs skills, and the staff has to mediate between their goals of encouraging learning (with its fluid, connecting, playful connotations) and the goals of making (which sells well to their funders and administration). One librarian admitted, “Because it’s all about framing, and if we were just like, oh, we are a visual art program and we do artist in residence...was that going to get the grants... the smart thing was to align it this way” (“Making as something new” section, para. 4). This is the kind of hustle and spin Lui (2016) found in her dissertation research, and in my pilot studies for this research.⁵ Lakind also describes the gendering that occurs when traditionally “feminine” activities such as crafts are recast as making, and thus fit more neatly into neoliberal narratives of labor, self-sufficiency, and skill-building. How the users understand these gendered activities is unreported, though Lakind does describe a making/learning dichotomy expressed by participants in a workshop, similar to the library workers’ understandings.

Willett (2018) explores issues of empowerment in looking at the experiences of users in The Bubbler, and in a knitting group in the same library. She found that users describe themselves in terms of various dispositions, including *empowered*, reflecting the Maker mindset that one’s disposition is altered—and bettered—through the process of making. Two minority teens describe a sense of power when using the library’s tools to ensure their voices are heard. She finds that several other dispositions may also be enhanced by maker activities in the library, including persistence and constant questioning. However, Willett cautions that users’

⁵ Crawford Barniskis, S. (2014). STEAM: Science and art meet in rural library makerspaces. iConference 2014, Berlin, Germany.; Crawford Barniskis, S. (2015, March 24-27). Metaphors of privilege: STEAM and public library makerspaces. iConference, Newport Beach, CA.; Crawford Barniskis, S. (2016). Access and express: Professional perspectives on public library makerspaces and intellectual freedom. *Public Library Quarterly*, 35(2), 103-125.

dispositions may not be directly impacted by the library, rather the library facilitates their ability to develop them through making. She addresses a key issue of power in her conclusion:

Libraries are in an ideal position to highlight ways making and learning are framed in sociopolitical ways. In designing programs, librarians can be asking whose knowledge and mindset is being valued, what counts as tinkering or innovation, and on whose terms are we defining and valuing making. (p. 12)

This conclusion reiterates a major reason for this dissertation research, to see how precisely librarians are doing this framing, and how the framing impacts the users, particularly in areas of power.

Williams and Willett (2017) do not speak to users in their study exploring boundary work in light of these spaces, which has to do with power, especially in decision-making processes about what a librarian does or does not do. Instead, they inquire of librarians about the types of work they do to ease tensions when several types of people and groups are coming together to make things in a public library program. They find that librarians actively seek to connect users with each other, the process of making, and the library. They do this through justifying what the creative place activities are. This reflects the librarians' interpretive schemes—just as with Lui's (2016) spin and Lakind's (2017) framings. Librarians reflect on how the reality of the activities match or did not match with their interpretive scheme, and then change either the scheme, and/or the activities. While the researchers do not explicitly speak to power in this study, they describe how practice informs and negotiates with librarians' interpretive schemes in a way that enables user power.

Halverson, Lakind, Willett, & (2017) joined forces to describe the Bubbler's community partnerships and diversity of design. They highlighted the makerspace's centrality as a core service throughout the Madison Public Library system. These researchers then conducted a three-year ethnographic review of the activities in the Bubbler, and reported on their interviews with library staff in 2019 (Lakind et al., 2019). They took a system-wide approach with a particular focus on learning. They found that the dominant theme of all the work done with the Bubbler centered on access. Since the Bubbler is free, inclusive, and arts-based instead of technology-

based, it was seen as “the hippie cousin of the makerspace movement” (“Libraries Provide Free and Inclusive Access to Making” section, para. 1). It was seen as providing access for a wider range of people than private makerspaces. It is unclear if this is the case, however, given that some of the eschewed expensive equipment, such as 3D printers, might be the types of making some people would like to access. The aim of the Bubbler is to offer new experiences rather than job readiness or skill building. Moreover, the Bubbler is based on programs, outreach, artist-in-residence programs, and gallery spaces. There is no at-will making within this “space.” In fact, the Bubbler could be best described as a series of arts programs rather than a makerspace. Thus, the claims to access should be clarified to mean ‘access to a specific set of programs at specific times.’

One of the key points that Lakind et al. (2019) bring forward is the way in which a manager of the space drives the connections between people and the community: “Because [the manager] has all of these really fantastic connections with people . . . [the manager] is like a super connector” (“Libraries Provide Community Connections for Makers” section, para. 7). His social capital, and the social capital of the library itself, helped to drive the program’s success.

Tzou et al. (2018) describe a way in which public libraries offering STEAM-based programming can do so through participatory processes and partnering with a variety of stakeholders. In this process, academics, practitioners and community organizations come together to develop programming. The researchers seek to disrupt “dominant relationships between humans and technologies... taking seriously the need to ‘create ... new openings for reciprocity’ between design partners, accountability between each other and to community partners...” (p. 58). They point out the need to be aware of the conflicts in the diverse framings of how and why programming is occurring, visible in the hustle and spin mentioned in so many of the studies discussed above. As with many of these studies, the researchers only interview library actors, so it remains conjecture as to how the participants or users of the spaces feel about the structural decisions made to share power. In addition, it is unclear to what extent the participants in the programs co-develop them to meet their own needs. Since all of the interviews occur among various organizational actors, it is uncertain if the users are involved at all. In fact, some

of the language suggests that the focus remains on institution-centered goals:

many questions remain about how best to provide librarians and other library staff with the resources, professional development, and disciplinary expertise necessary to deeply engage learners with science phenomena and engineering design practices. (p. 59).

The study does not reveal anything about user power in the design process, nor in the programs themselves.

Maggie Melo and her co-authors' recent work has begun the process of most explicitly examining issues of power in public library makerspaces. Her dissertation research and subsequent journal publications investigate the erasure of women's making in makerspace contexts, and the "shadow rhetorics" that sideline their activities and presence in the maker movement (Melo, 2018, 2020). While this dissertation explores a non-library makerspace, the participants are 72% novices and doing work similar to that in library makerspaces (2018, p. 98), and the research provides valuable information about how:

Innovation is an exclusionary discourse that highlights and rewards demographics of a particular skin color, class, and gender. This is problematical since innovation continues to serve as a benchmark and/or metric to drive success in many institutions. (p. 15)

Melo sees women give way to male makers, considering their work as less important. She finds that people of all genders saw CNC routers, VR equipment, microcontrollers and laser cutters as primarily used by men, while women primarily use the sewing and craft equipment (p. 100). She finds that the creators of the space are wary of providing sewing equipment for fear it will "send the wrong signal" (p. 102)—i.e. that it would send an "affective signal *"for women"* in visitors" (p. 103.) The technologies themselves signal who belongs, and where. She finds that women are receiving weaker "welcome" signals than men in the makerspace. Her key finding is that rhetorics of innovation act to repress the participation of women and girls in Maker culture and sideline the work they do within makerspaces.

Remaking the Library Makerspace

Melo's later work did look specifically at libraries, though these were generally school and academic libraries. In fact, in 2020, after this dissertation's data was collected and analyzed, a new book asked some of the questions this study asks: namely, how is power manifesting within library makerspaces? This book, *Remaking the Library Makerspace: Critical Theories, Reflections, and Practices*, was edited by Maggie Melo and Jennifer T. Nichols. In it, a variety of theoretical works and case studies explore who is being marginalized in the Maker Movement in libraries, what activities are privileged, and what libraries should do to ensure equity and inclusivity. Most of these works look at university libraries, but their findings are applicable in a public library setting.

Several chapters focus on whom library makerspaces center and exclude. Findings include:

- People other than cisgender white males may be marginalized or feel uncomfortable in the spaces when they are presented as individualist, skills-centered, and tool-oriented spaces, and makerspace administrators should focus upon ideas rather than tools when creating programming, and center care and community (Brown, 2020);
- Women of color experience significant exclusion in a university makerspace, including feelings of paternalism, dismissiveness, gender biases and racism directed at them. The authors recommend workshops and programs aimed at real inclusivity, not just encouraging a range of diverse people to attend, but actively reaching out to communities of color and non-men (Sanchez, 2020);
- A university makerspace space is intended to impress people but prohibits some making. Cirell (2020) finds similar issues to Sanchez et al., with "mansplaining" or men overexplaining and taking over projects for women. They also find that a thirdspace emerges through students adapting the space, through mentorship opportunities, and through simply hanging out, much like Mimi Ito et al's (2009) findings about teen media use through "hanging out, messing around, geeking out" (HOMAGO);
- Higgenbotham and Rouse (2020) take pains to point out that "the primary activity that occurs in any makerspace is making" (p. 153). This is a stark contrast to the making-is-learning narratives espoused by many LIS scholars. They identify three significant barriers to inclusivity: cost, culture, and physical access. The culture of the spaces could feel intimidating, especially when there was a staff that was less-diverse in terms of both race/ethnicity and skillsets.
- Nay (2020) explores imposter syndrome, determining that libraries are the imposters in the makerspace movement, which causes their administrators to feel less-than other spaces. She defends the spaces as "not inferior to other spaces and we are every bit as real" (p. 293).

All of these works address feelings of inclusion and exclusion, power and powerlessness, in terms of library makerspaces.

The authors use myriad theoretical frameworks centered on power, such as critical race theory, feminist and indigenous methodologies, critical spatial theories by Lefebvre and Soja, and liberation theories such as those espoused by Paolo Friere. This is quite different from many earlier studies of library makerspaces, which often were ungrounded in power theory. Mann (2020) uses the theory of Paolo Friere to explore neoliberal narratives of making, particularly narratives of collaboration based on underfunding agencies such as libraries, resulting in the desire for fast innovation to ameliorate conditions of scarcity. It also results in less-powerful collaborators being sidelined or left out of decision-making processes entirely, such as the students in the university makerspace model Mann is interrogating. They point out Friere's opposition to "saving" the oppressed, instead calling for "distinct subjects meeting as equals to name and transform a shared world" (p. 236). Mann, like Illich and his friend Friere, calls for the recognition of mutual interdependence, specifically in processes of collaboration in and around makerspaces. Mann then calls for acting in solidarity with those who are voiceless by structurally inviting them into decision-making at the beginning of projects, and to engage in ethnographic research of makerspace practice to ensure advocacy for the makerspace users who are often limited in power. Finally, Mann calls for librarians to become learners through "the difficult and often vulnerable process of learning through dialogue and critical reflection." (p. 241).

Rowgowski et al. (2020) wrote one of two chapters in the book dedicated to public libraries, and looked at the needs of rural communities. This chapter was informed by a three-year research study investigating librarian perspectives on youth STEM activities in rural libraries (Lee, Recker, & Phillips, 2018). Without asking the library patrons what they wanted, the authors emerged with findings such as:

We argue that the typical makerspace model with a shop-like room filled with fabrication equine is neither affordable, sustainable, practical, nor desirable for most rural and small-town public libraries. (Rowgowski et al., 2020, p. 169)

Indeed, such spaces may not be affordable, etc. but these authors do not clarify that their lack of desirability is from the perspective of the library, not the users. This lack of care in establishing BY WHOM things are or are not desired signals that the reader should take the rest of their recommendations with a grain of salt. Nevertheless, some of their findings are notable. They find rooms in which few users are active, except a couple of men, sequestered spaces that feel un-enterable without explicit permission, and that programs held in the more generalized “library” (rather than “makerspace”) spaces appear to meet the needs of the youth, as elucidated by the library staff. This chapter lists several inexpensive STEM-focused items for libraries to consider, and gives examples of maker programs and spaces in a few communities, highlighting the use of general library space instead of dedicated makerspaces. The other chapter exploring a public library makerspace, grounded in Sherrill’s (2020) dissertation research, also focuses on inclusivity. It points out that the Lab, located in a large Minnesota library, marketed itself with language of job and skills training, but also developed a diverse user base. In his two days in the space, Sherrill observes two workshops, and speaks with library actors. He later follows up with a 1-question electronic survey of users, asking them to rate their satisfaction with using the space on a 4-button Likert scale. Of the 70 responses, 100% are positive and 86% are very positive (p. 274). Sherrill grounds his work on Derrida’s concept of hospitality. He finds that one of the factors that appears to build the inclusive space is the practice of staff members individually greeting everyone who enters, structured orientations, clear behavior guidelines, the diversity of the staff, signage reading “Refugees Welcome,” labeling all the equipment, and the naming conventions of the workshops: “Learn [skill] with [person]” (p. 271). This naming protocol is an intentional choice to respond to user needs. Librarians chose it to identify which volunteers have which skills, to know exactly what would be taught, and to avoid the low engagement with drop-in programming in that space. He also finds sewing workshops are particularly important, with people who are homeless using them to repair clothes, and others to donate items to local shelters. “After dark” programs, held because the library closes at 5 p.m. and excludes working people from accessing it, are deliberately social in nature, helping to build a sense of community

or social making. This study, while quite limited in scope and time, nevertheless identifies many issues for further research, including issues of hospitality.

The most valuable chapter in this book, for this study, is that by Brianna Marshall and Maggie Melo (2020). This chapter reframes makerspace services from “needs analysis” to “power analysis,” in effect doing exactly what this dissertation set out to accomplish, though using a different theoretical framework. Instead of invoking Illich, Marshall and Melo use LIS scholar Emily Drabinsky’s definition of power:

...as a means to produce order: to facilitate “some ways of knowing and not others, representing certain ideological ways of seeing the world, and, crucially, not others” (citing Drabinsky, p. 85)

They do not pin down further theoretical processes of power beyond this concept of informational power, or to point out the non-neutral power enactments of libraries and makerspaces. Instead, they create a framework for investigating power by considering the needs of those often powerless: people of color, non-cisgendered people, and women. Their framework evolves as a series of empathetic questioning exercises, encouraging self-reflexivity about one’s own power, decision-making processes, funding, who does not use the space, the spatial arrangements, tools, programs, and facilitators within the space, and the outputs of the space, including issues of intellectual property. While this chapter is not specifically grounded in the findings of a user-centered study, per se, Melo’s (2018) dissertation work, and Marshall’s work with people in the university makerspace setting, *is* so grounded. Nearly every one of the 70 questions Marshall and Melo ask is addressed in this dissertation, even though this list was not published until well after I collected my data and did the bulk of the analysis.

Much of *Remaking the Library Makerspace* focuses upon ideas for developing makerspaces, while highlighting the fact that people desire different things from these spaces—not only learning or even only making. Lenstra and Moorefield-Lang (2020) take a different approach, focusing on the physicality of making and the desire to physically engage with one’s environment. They offer suggestions for physical movement and creating objects to sustain

physicality, from skateboards to life-sized boardgame experiences. Lister (2020) highlights trauma-informed making that encourages dispositional shifts of resilience, independence, confidence and relationship-building. Koh et al. (2020) look at peace-centered and empathetic making in school libraries and the potential for reducing emotional violence such as bullying.

In all of these works, in the book edited by Melo and Nichols, or the works by Lakind, Willet, and so on, one theme recurs concerning power: the ways in which library actors frame, interpret, or justify their activities and spaces are power expressions. Whether or how they then accommodate user perspectives and needs reveals how much power the user may express in these spaces or activities.

Theoretical Works on Public Library Creative Places and Power

Like much of Melo and Nichols' (2020) book, other scholarly works on public library makerspaces are theoretical (and/or not centered in research of user experiences) in their discussions of power. For example, Willett (2016) did a discourse analysis of public library makerspace literature, and questions several of the discourses of power that she found there. She questioned the empowerment rhetoric founded in the idea of more economically viable employment skill-building, the democratization of making to marginalized groups, or productive DIY power. She pointed out that, the literature alludes to empowerment, "without specifying how this empowerment manifests itself" (p. 322). She stated that the makerspace narrative in libraries "frames libraries as much more than repositories... and embeds libraries and makerspaces in ideologies related to community and empowerment" (p. 319). She pointed out that the empowerment rhetoric is not backed up with how this might occur, nor whether or why community members may even wish to create rather than consume artifacts (p. 322).

Similarly, Meyer and Fourie (2015) said that "Makerspaces can be associated with social capital, power play and power dynamics," (p. 522-523), but did not explore this idea further. Instead they determined that "makerempowerment" and "makercaring" (p. 520) are potential frameworks for understanding the value or impact of library makerspaces, but that these

thoughts would be explored in future research.

Other articles have invoked the concept of power in relation to public library creative places, but without fleshing out the concept or the processes of power. For example, Ginsberg (2012) reiterated a common refrain: “maker culture shifts control to the individual, helping her achieve self-sufficiency and success by giving her power over her own ideas...[patrons] could also be empowered by learning the skills, tools, and attitudes of making” (p. 91). Similar concepts can be found in many professional articles on library makerspaces, (e.g. Britton, 2015; Domsy, 2013; Garcia et al., 2014; Hartnett, 2016; Prato & Britton, 2015; Welch, 2017). In these and many other articles, the enactments of power were either unexamined or based on the idea that the simple fact of physical and/or intellectual access to tools results in empowerment, presumably for all members of the community. While a couple of studies, such as Teasdale (2020) begin to unpack issues surrounding power in makerspaces, no research has determined that such a sense of empowerment exists from the users’ perspective.

Public Library Makerspaces as Convivial Tools

Aside from my own work, all three concepts (public libraries, makerspaces, and convivial tools) interrelate in very few articles and dissertations. Ginger et al. (2012) links Illich and library makerspaces, describing the need to critically assess makerspace technologies in light of active mastery. Willett (2016) briefly notes that Illich’s concept of convivial tools has been explored in the making and computing literature in her discourse analysis of library makerspace rhetorics, but does not engage with the concept further. In her dissertation research concerning the educational possibilities of public library makerspaces, Deborah Lui (2016) cites Illich. She remarks that Illich’s convivial tool theory, as well as his concept of “learning webs” (Illich, 1971), helped to shape the Maker movement. Learning webs are networks developed by individuals to find partners in learning or inquiry. Lui describes learning webs in a public library makerspace, in which “communities could share and swap access to educational resources including tools, objects and people” (Lui, 2016, p. 61), acts as a learning web. However, Lui did not use Illich’s

theories to frame her study, instead situating her work in Michel de Certeau's theories of *strategies* and *tactics*.

Welliver (2017) examined the state of public library services for seniors in Delaware in an executive paper. She linked Illich's theory and makerspaces to the needs of older adults to learn and connect with others. While she did analyze Delaware library statistics to see how older adults are being served, she did not speak to the library users regarding their needs., nor did she develop the connection between those services and conviviality further. Swedish researchers Hult and Bradley (2017) leverage the concept of conviviality more thoroughly, but focus upon a private makerspace, mentioning in passing the possibility that the local public libraries could be "hacked" to provide tool lending libraries, sewing machines, or other makerspace-adjacent activities. Neal et al. (2019) use the term conviviality, although they move from Illich's original meaning to a wider concept to explore communal, multicultural spaces. They are also focused on many different sites of convivial relations, including one public library's creative writing group. They find that, for the maker practices of that group, "the public library...was seen as key to making the group accessible and inclusive" (p. 78). This was due to a sense of comfort, confidence in use, and the fact that it was free. None of these works fully interrogate convivial tool theory in light of library creative places.

Power in Makerspaces

The DIY, Computer-Supported Cooperative Work (CSCW) and Human-Computer Interaction (HCI) literatures not only speak of makerspaces and maker culture, but also often address issues of power, including issues of conviviality. Outside of the library literature, power has been a focus of research done on private or cooperatively-run makerspaces, the so-called Maker Movement, or Do-it-yourself practices. Some of the research most relevant to this study include:

- Ames et al. (2018) find that an individually-empowering technical imaginary of making, as understood in Western terms, does not reflect the precarious making-do activities revealed in other countries, especially developing nations. Western rhetoric is elitist, gendered, and does not reflect the so-called "countercultural" narratives that are often

invoked in the Maker mythos.

- The Tanenbaum et al. (2013) study describes ways in which makers can appropriate commercial objects and remix or recreate them as a path to empowerment, though they note that the makers must navigate and benefit a variety of structural realities, industrial products, and standards to do so.
- Research by Grimme et al. (2014) describes empowerment as “a state of being in which subjects feel enabled to activate their knowledge, manual skill, and/or ‘materially productive engagement’” (p. 433), and find that makers in three spaces report a strong sense of self-empowerment, empowerment of others, and of the making community.
- Toomb’s (2016) dissertation research finds that members of a private makerspace self-empower through the creation of their own tools, and through developing a belief in one’s own abilities.

These scholars and many others, such as Nascimento (2014), Sivek (2011), Bratich and Brush (2011), Bazzichelli (2013), and Lindtner (2013), trouble the assumptions that Maker/DIY practices provide empowerment with discussions of the exclusions and exceptions in these practices. These exclusions are gendered, based on education, income, geographic location, types of making, and expertise, as well as being founded in concerns about how empowering making can be in the context of a capitalist economy. As Whelan (2018b) finds in her study of gender and identity in maker activities, the seemingly inclusive Maker movement retains the “consistent reproduction of old paradigms of exclusion. Some women may avoid a maker identity while still engaging with maker technologies, but the consistent, identity-centric rhetoric of the movement creates a sense of alienation” (p. 78). The broader field of study of making and makerspaces has confronted issues of power, capabilities, and social justice for many years, whereas such issues were largely ignored in the LIS literature until after this dissertation study’s data collection began in 2016.

In another example, Diaz, Tobias & Lefebvre (2021) explored concepts of empowerment related to government-supported makerspaces in Barcelona, that, like public library spaces, are free for users. These spaces are aimed at re-industrializing communities, supporting innovation, and skill building. They noted that despite repeated invocations of empowerment ideology throughout the makerspace literature and this project, little was understood about the processes of empowerment, much less the extent to which makerspaces support those processes. They note

that empowerment-based imaginations are uninterrogated, and assume that “voluntary provision of technologies automatically lead to empowering individuals” (p.2), and that the US in particular situates empowerment as an individual act aimed at remediating deficits for economic purposes. In their study, they found significant pushback from communities, including a group occupying a makerspace to protest an “elitist project that did not meet their needs” (p. 7). This resulted in a shift in programming to support activities such as gardening. As in library spaces, many of the users in the Barcelona fablabs were new to the technical workshops provided in the spaces. Thus an active outreach style developed, where users are not left to flounder on their own, often through structured peer learning activities wherein users with a dozen or so hours of experience in the space assists others. 80% of the users reach the level of expertise to assist others. The makerspaces have developed a culture of social sharing. The researchers find that political-level narratives of empowerment have thus resulted in some individual empowerment, but that more collective and political forms of empowerment are not yet optimal. In response to these findings, the authors propose a model of empowerment involving several processes that cycle through individual, collective, and political levels of empowerment. These processes begin with understanding the potential of these tools, motivation to learn, physical access, intellectual access, and active roles in a participatory social roles in making communities. Throughout the model, the authors note various necessary capabilities, including feeling one belongs to a community, the capacity to influence the use of tools, and shifts in disposition involving confidence, skills, and the ability to generate new knowledge.

The non-library makerspace literature describes the social connections that are vital to makers (Goodman & Rosner, 2011; Hall, 2001; Kurlinkus, 2014; Lindtner, 2012; Moilanen & Vadén, 2013; Purdue et al., 1997; Rosner, 2012; Rosner et al., 2014; Van Oost et al., 2009). Creative places offer meaningful opportunities for learning, especially participatory and hands-on learning (Kuznetsov & Paulos, 2010; Lui, 2016; Nygren, 2014; Schrock, 2014; Sheridan et al., 2014). One of the themes in the maker/hacker literature is that learning is participatory, networked, and involves dispersed authority (Bell et al., 2014; Bradley, 2014; Dawkins, 2011;

Dieter & Lovink, 2012; Nitsche et al., 2014; Nygren, 2014; Schrock, 2011a, 2011b; Tanenbaum et al., 2013). Often, maker learning occurs through peer-learning relationships (Kuznetsov & Paulos, 2010; Sheridan et al., 2014). In a relevant study, Han et al. (2017) survey 121 makers in South Korea (68% male, all over 16 years of age), and find that feelings of autonomy, competence, and relatedness impact makers sense of intrinsic motivation to use makerspaces, particularly feelings of competence. Pursuant to this dissertation, Han et al. find that feelings of social support do not impact the makers' sense of competence. The authors conjecture that this is due to a low level of peer sharing or co-working in these private spaces, particularly in South Korea. This finding runs counter to the many claims in the LIS literature that peer-learning assists makers in increasing their skills. Such findings should be investigated further in a United States context.

DIY Practice and Resistance

To understand the maker movement in general, one must also look at the practice of DIY, or Do-It-Yourself. Scholars define DIY in terms of “self-organizing networks” (Purdue et al., 1997), with members who “create alternatives to mainstream consumerism” (Hemphill & Leskowitz, 2013, p. 58). DIY is not only making or renovating things, but can involve a lifestyle spanning dumpster-diving to homeschooling (Hemphill & Leskowitz; Wehr, 2012). The maker movement itself is sometimes called “third wave DIY,” to differentiate the subsistence-level DIY movement of farming and homemade clothing, the industrial wave of DIY, in which people made their own things, and the new wave of information-focused DIY (Fox, 2014). A key concept in DIY is the idea that it is an act of resistance to social, economic, and power inequities (Brahms, 2014; Breeding, 2012; Campbell, 2005; Carlsson, 2008; Dawkins, 2011; Gauntlett, 2018; Goodman & Rosner, 2011; Lukens, 2013; Santo, 2011; Springgay, 2010; Tanenbaum et al., 2013; Watson & Shove, 2008; Wehr, 2012). Making is framed as an act of self-reliance and power (Gauntlett, 2018; Wehr, 2012).

Some scholars of hacking and DIY stress the possibility of resistance as enabled by

creative activities and spaces. Gauntlett (2018) described “embroidery as a ‘weapon of resistance’” (p. 10), because the act of making itself resists alienation and materially connects the maker with the product. Others see DIY and makerspaces as inculcating resistance to neoliberalism or capitalism, which they frame as inequitable economic systems and practices (Dafermos & Söderberg, 2009; Maxigas, 2012; Sivek, 2011). Maker practices offer a path toward continued active creative processes involving ownership, authorship, and active production of one’s own existence (Shorthose, 2004, p. 4). These characterizations emphasize the idea that creative practices are critical, nonviolent, and personal acts of resistance to hegemonic economic and power structures.

Another two studies explore some of the power issues in makerspaces. Sheridan et al. (2015) find that work in three different makerspace environments offer a diversity of learning arrangements that are often convivial in nature, i.e. users can choose from a variety of structures to suit their own needs. This is particularly visible in community-supported and membership-only spaces they study. They also find the process of making and the community involvement in making to be key components in the success of these spaces.

DiGiacomo & Gutiérrez (2015) find that power relations are a central component of a school makerspace. They ascertain that the social organization of makerspace practices impacted how the users felt. They describe two main outcomes or components of relational equity: *relational expertise*, which helps even novices feel a sense of confidence in encountering new materials and *relational agency*, “the capacity for working with others to solve problems” (p. 11). These three factors interrelate to support learning through making. Both of these examples focus on learning as the primary preferred outcome of makerspaces, but explore the importance of conviviality within the spaces.

In contrast to the often uncritical appropriation of the idea of makerspaces in the pre-2016 library-focused literature, HCI scholars Ames and Rosner (2014) provide an example of user-centered scholarship outside of libraries. They explore the experiences of children in non-library makerspaces in an ethnographic study. Their paper describes not only the users’

perspectives on such spaces, but also connects them to social and educational theory. Ames and Rosner align the creative activities in a volunteer repair collective and in relation to Negroponte's One Laptop per Child project to resistance and convivial social and learning, while critiquing notions of exceptionalism, technological determinism, and gender inequalities that can run through the rhetoric of these spaces. Furthermore, they point out the power expressed through ideologies of making in these instances. For example, they notice that children's curiosity is identified within only a context of technological orientations and initiative (p. 8), and that, despite claims of projects being child-driven, "coaches 'scripted' the repair of the one child-visitor at the clinic to be a successful one" (p. 12). Ames and Rosner explore notions of making, institutions, power relations, and technology from a user-centered yet theoretically rich perspective. It highlights many of the technologically-deterministic assumptions also mentioned in the LIS literature, and explores how relevant they are in practice, challenging many of the notions of user empowerment and social learning that are also cited in the LIS literature.

Summary

This literature review reveals gaps in our knowledge about how public library makerspaces are impacting their users, especially in the area of power. Not only do we not know much about the processes or enactments of power in makerspaces in public libraries, we have little sense of how users of libraries might experience power in other aspects of public library use. No studies yet detail the overarching lived experiences of the users of these spaces, nor do they situate themselves in the interests and concerns these users have. Instead, much of the existing LIS literature on makerspaces focuses on the institutional goal and imaginaires of learning, as laid out by the federally-funded IMLS, which the U.S. government enjoins "to promote literacy, education, and lifelong learning and to enhance and expand the services and resources provided by libraries, including those services and resources relating to workforce development, 21st century skills, and digital literacy skills" (Museum and Library Services Act, §9121(5)). User perspectives on resistance, power, self-reliance, what users are making or would like to make,

governance of the spaces, or impacts of the spaces on communities, remain largely a mystery in the LIS literature, unlike the DIY and hackerspace literatures.⁶

This study does not limit itself to consideration of learning, literacy, sense-making, creativity, or democratization of knowledge, but spans all these topics. It also builds upon other topics that are either little discussed in these studies or outside their scope, based on the data provided by the participants. This study elaborates on the limited discussion of power in the creative places that the earlier studies established. Furthermore, this study expands the range of participants to include a variety of community stakeholders, including adults and children, library users and non-users, makers and those who do not identify as makers, staff, administrators, government officials, local business owners, funders, and community organizations. In short, this study is the first to situate the perceptions of the impacts of public library creative places in the context of the entire community. This is significant because of the various perceptions these groups have on libraries, on makerspaces, and the varied needs they have.

In Chapter Four I will describe the methods I used to speak to the users, as well as the institutional actors who provide access to public library creative places, and other community stakeholders. The multi-site ethnographic methods describe three distinct cases that help to illuminate the diverse cultures being created in these spaces, and how they impact users' senses of power.

⁶ The diverse funding of each of these spaces may be a factor; libraries are publicly funded—and precariously so (e.g. Alexander, 2013; Carpenter, 2020; Harissis, 2017; OCLC & Association, 2018), and the co-operative DIY spaces are privately funded, sometimes through corporate funds, sometimes through membership fees. They are also existing in a state of financial and membership precarity, though they do not have the public mandate that libraries have (Han, et al., 2017).

Chapter Four: Research Methods

As noted in Chapter 1, I am studying the discourses and practices of power surrounding creative places in public libraries, so that we better understand how these creative places in public libraries impact their users' perceptions and processes of power. To undertake this, and to explore whether and how users are finding these creative places to be what Ivan Illich (1973) calls “convivial tools,” the research methods for this research must take into account both the participants’ sayings and their doings in and around these spaces.

This research is qualitative and constructivist. It situates the understanding of the enactments of power in library creative places in practice: “a view in which an individual mind constructs reality but within a systematic relationship to the external world” (Talja et al., 2005, p. 81). It uses ethnographic methods of interviewing and participant-observation to engage with the multiple stories people tell about what they are doing and why, and how it impacts them. Constructivist methods of grounded theory analysis relate these individual stories and experiences to the shared world of the makerspaces more generally (Charmaz, 2006, 2014), as well as to Illich’s theory. In addition, the study examines three distinct cases to understand a range of different types of makerspaces, in different spaces, contexts, and communities. I selected these methods to ensure the broadest possible internal and external validity of the data.

This chapter will explore the way in which the study is designed, and the rationale for that design. It will offer an overview of the methods used to collect and analyze the data, and note how such methods have been used in similar studies. It will also introduce the three cases selected, and describe how and why these selections were made, as well as how individual participants were selected. Finally, this chapter will confront the limitations and ethical implications of the research method.

Research Questions

The gaps in the literature and conversations with librarians and makers spurred this study to understand how public library institutional discourses and practices, as well as individual

discourses and practices, shape the conviviality of public library creative places for their stakeholders. To understand this, two main research questions are asked:

RQ1: What are the lived experiences of the stakeholders in public library creative places, specifically involving power?

RQ1a: What are the institutional discourses and practices involving power in these creative places?

RQ1b: What are the individual discourses and practices involving power in these creative places?

RQ2: How can convivial tool theory intersect with these discourses and practices?

These questions arose from the oft-stated theory that makerspaces, and the electronic tools therein, are democratizing or empowering (e.g. ALA, 2014b; Brady et al., 2014; Britton, 2015; M. Garcia et al., 2014; Hartnett, 2016; IMLS, n.d.; Meyer & Fourie, 2015; Wapner, 2015a). In choosing Illich's (1973) theory of convivial tools to frame the concept of empowerment, these questions emerged as the most crucial to identify how and if these spaces are meeting the needs of the users, as defined by the users.

These questions explore users' perspectives on whether the spaces and services accomplish the ends the users deem important, what sorts of impacts the library has in realizing these ends, and what means are instrumental in realizing them. Furthermore, the other stakeholders, including the library staff, trustees, politicians, and other community members, may hold different perspectives on the power necessary, desirable, and possible in a creative place. They may prioritize different ends. They may understand different means to those ends as important. By examining many perspectives, this study aims to assess the perceived and enacted impacts of the spaces on the various stakeholders, their sense of power, and from what source they believe that sense of power derives.

Preliminary Studies

To ensure that this research would fully address this research problem, I did two preliminary studies to ascertain which user-centered method would best address the

phenomenon of library makerspaces. These each were also Institutional Review Board-approved. The first exploration involved interviews with thirteen librarians who offer such services, examining the ideologies of intellectual freedom and access to understand librarian discourses about the spaces. In this exploratory study, many of the convenience and snowball-sampled interviewed librarians expressed a need for practical answers on how to implement services, arrange spaces, charge for materials, train staff and patrons, and so on, though several publications on library makerspaces addressed these issues (e.g. Bagley, 2014; Brady et al., 2014; Britton, 2012a; Burke, 2014; Slatter & Howard, 2013). These librarians also identified diverse governance and programming structures, the need for psychological and social aspects of access, and what they felt were novel ways of offering library services to their communities. In the end, I decided that it was not sufficient to only speak to library staff.

In another exploratory study, I spoke with six convenience-sampled makers who had used library spaces. This study found that they identified a sense of power in describing their own making, and that this power appeared to stem from social interactions more than the products made or the tools used. These institutional and individual discourses lead me, in part, to this study. Because the librarians and the users were speaking of often dissimilar aspects of making and connecting in these makerspaces, I needed to ensure all of these perspectives may shine through the method I used for this study. Moreover, because these studies revealed a dearth of understanding of the actual practices enacted in library makerspaces; the interview data was not enough to fully explore power processes in these spaces. This is a question about practice, and requires a practice-theory approach to research methods.

The Epistemological Foundation of the Study

The selection of a constructivist qualitative method is founded upon the need to interrogate stakeholders' subjective understandings of their lived experiences in these spaces. Constructivist qualitative research has the ontological position that, "Realities are apprehendable in the form of multiple, intangible mental constructions, socially and experientially based, local

and specific in nature (although elements are often shared among many individuals and even across cultures)” (Guba & Lincoln, 1994, p. 110). In this paradigm of research, the researcher and the researched are inextricably linked, and the findings are constructed through interpreting many, sometimes conflicting, narratives. As Guba & Lincoln note, the aim of constructivist qualitative methods is to understand by building consensus among these narratives, explicitly in terms of empowerment (p. 112). Analysis in this method is inductive, moving from the specific instances of phenomena to a general understanding. And it is emergent, deriving organically from the processes of data collection and analysis.

To see how power is expressed, the research questions address the practices in these spaces. To explore practice, one must consider practice theory and its epistemological foundation. Practice theory is concerned with “situated sets of embodied activities grounded in time and space, and as reproductive of the social, which means that what is going on in practice contributes to maintain practice” (Pilerot et al., 2017). It studies activities and discourses that express agency and power. As practice theorist Barnes (2005) explains it, “To engage in a practice is to exercise a power” (p. 28). While different practice theorists explore and expand on the practices of power differently, it is a central concern they share. The methods of this dissertation rest upon practice theory when it asks what the various stakeholders involved in public library makerspaces can and cannot do. In addition, if engaging in a practice is exercising a power, the practice of research, and the role of the researcher, enacts power relations. I will discuss this in describing the researcher’s role, the ethics of the research, and limitations of this method.

Some practice-focused LIS researchers include Olsson and Lloyd (2017), Pilerot (2013), McKenzie (2006), Cox et al. (2017). These researchers focus on situated knowledge, sociality, the body and materiality, habits, and change. Since the focus of this study is concerned with all of those, and the social activity within and around library makerspaces situated in multiple locations, an approach similar to multi-sited ethnography is appropriate (Pilerot et al., 2017). A practice-based study expresses an epistemic stance that practices can only be knowable in examining both discourse and embodied action. The intentions and motivations that participants

assign to their choices are as revealing as action, so both interview and participant-observation are necessary to examine the situated practices that will reveal power enactments.

The preliminary studies revealed a need to understand the project through a practice-centered constructivist approach, and that this understanding is provisional and contingent on context, even as it may be abstracted to generate new understandings that are transferable to a variety of situations. Kathy Charmaz (2006), who writes of interpretivist (in particular, constructivist) grounded theory, states that

The logical extension of the constructivist approach means learning how, when, and to what extent the studied experience is embedded in larger and, often, hidden positions, networks, situations, and relationships. Subsequently, differences and distinctions between people become visible as well as the hierarchies of power, communication, and opportunity that maintain and perpetuate such differences and distinctions. (pp. 130-131)

These differences, distinctions, and hierarchies were necessary to understand the conviviality and any other hidden power practices in these makerspaces. Thus I use Charmaz's (2006, 2014) constructivist grounded theory analysis methods for this study.

Research Design

To answer the research questions, I selected three variable public library makerspaces and spent 403 hours between April and October of 2016, observing and asking what the practices and discourses were. Since the research questions require an exploration of the sayings and doings of the stakeholders, I needed to ensure that I collected data that included both perceptions of power (including conviviality), and the practices in which participants did or did not embody convivial power relations. I also needed to collect this data from a variety of stakeholders. To this end, I selected the research design of comparative case study using ethnographic data collection methods and a data analysis method of constructivist grounded theory.

Ethnographic Methods

To collect the data for analysis, the study used ethnographic methods involving interview, participant observation, and document analysis. Ethnographic methods allow for a holistic,

constructivist approach toward understanding the overall culture of a makerspace, the webs of meaning people have constructed and inherited about their actions, discourses, symbols, and institutions (Geertz, 1973, p. 89). Ethnography examines culture, “as it is experienced and accomplished by the very people involved in its production...with the meanings people attach to their situations and the ways in which they go about constructing their activities in conjunction with others” (Prus, 1996, p. 9). Ethnographers describe cultures as they interpret them through *thick description*, a concept Geertz borrows from Gilbert Ryle to describe and analyze these cultural meanings that constitute and make sense of social actions (p. 6). These thick descriptions offer multiple entry points into understanding the meanings participants ascribe to their actions. Thus ethnography involves looking at the world from the participants’ perspective (Crabtree & Nichols, 2000, p. 2).

However, while an *ethnography* involves a lengthy engagement with a culture in multiple daily contexts with the aim of fully interpreting that culture, *ethnographic methods* are ways to come to that understanding. Since limited time was available for fieldwork in this study, this project involves interviews and participant-observation rather than a fully-reconnoitered ethnography. Only one aspect of the participants’ lives is under investigation, that involving public library creative places. This is a limitation of the study.

While ethnographic methods are used in LIS, I have yet to find a complete ethnography of a library’s culture. Instead, public library research uses ethnographic methods to provide rich

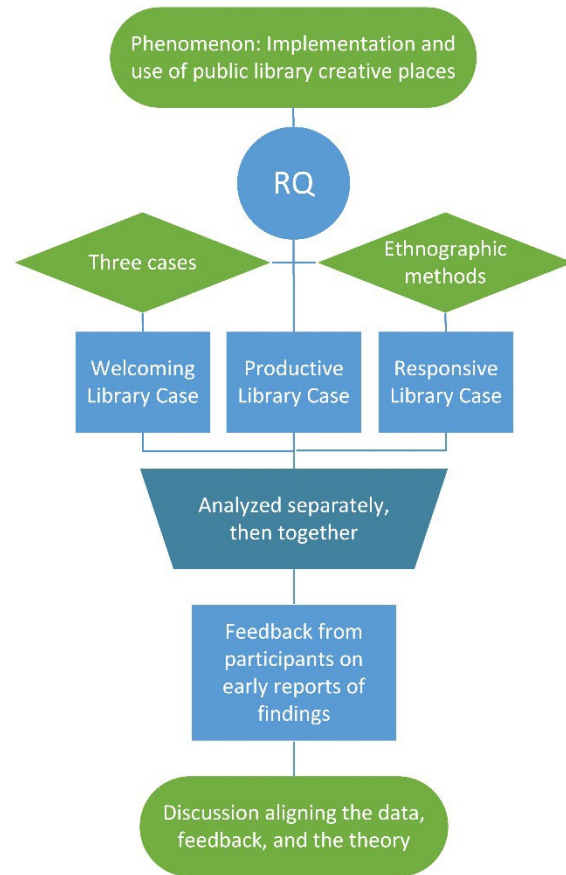


Figure 1 Research Design

descriptions of library user's actions and thoughts. This type of research is scant, yet is an excellent method to answer questions about library impacts and user-centered outcomes (Ma, 2009). LIS researchers use ethnographic methods to understand the practices of the user of information systems (e.g. Bryant, 2009; Lingel & Boyd, 2013; Prigoda & McKenzie, 2007). LIS scholar Lai Ma (2009) calls for a form of critical ethnography for "explicating ideology and power relations by reconstruction of meaning and conceptualization of social systems" (para. 4). Such ethnography is recursive in alternating between theory and the practice evident in the data, and "leads to alterations in initial interpretative frameworks so that they encompass those of the culture, subculture of interest." Though this study does not use the specific critical ethnography method as Ma (and its originator, Carspaken) outlines them, it does take a recursive view in comparing theory to the data and amending the theory to align more with actual practice. Thus this study uses ethnographic methods of data collection, with an aim to understand culture (as the participants live and present it) as fully as possible given the constraints of time. In addition, convivial and power theory acted as an evolving framework for data collection and analysis.

Case Study Methods

The case study aspects of the method focused this inquiry on three specific instances of the phenomenon, including how these creative places came to be, were funded, how they are understood by a variety of stakeholders, and how they are funded and staffed. Comparative case studies have long been used in LIS to understand how phenomena develop in different contexts and whether any variables are shared between cases (Ashman, 2002; Audunson, 1999; Miller, 2014; Oliver, 2004). A case study "investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2013, p. 13). Such a study is necessary to explore the social relations of power within public library makerspaces, since it was unknown what might affect those relations.

Case studies allow researchers to build a deep understanding of a phenomenon in a particular context. Comparative case studies allow the research to find commonalities and

differences, and thus are more broadly transferable or externally valid results, though causality cannot be determined. Rather than the analytic methods which use Boolean analysis to describe deterministic patterns within cases (Lieberson, 1991), this series of cases is understood within Diane Vaughan's (1992) *theory elaboration* context.

Vaughan (1992) describes how analysis repeated over several different types of cases, can allow the researcher to refine or elaborate their working theory. She describes the process:

We begin by using a theory, model, or concept in a very loose fashion to guide the research. Cases are chosen because (1) they are potential examples of research topics; (2) they vary in size and complexity (e.g., groups, simple formal organizations, complex organizations, subunits within them, or networks), and (3) they vary in function ... We analyze the cases sequentially. We treat each case independently of others, respecting its uniqueness so that the idiosyncratic details can maximize our theoretical insight. As the analysis proceeds, the guiding theoretical notions are assessed in the light of the findings. (p. 175)

In this study, I analyze each case separately and together, against the backdrop of theories of power and convivial tools, and in light of *in vivo* practices. Through a comparison of diverse cases, I am able to specify how the theory and practice intersect. Vaughan's theory elaboration method has been used within LIS and allied social science fields to provide theoretic depth and emendations of existing theory, as well as to develop new theory (Coburn, 2004; Gibson et al., 2002; Palmer & Neumann, 2002; Sawyer et al., 2008; Vandenbosch & Huff, 1997). Descriptive, comparative case studies have already been used to explore makerspaces outside of libraries (Ames & Rosner, 2014; Boeva & Foster, 2016; Sheridan et al., 2014).

Grounded Theory Analysis

I analyzed the resulting data using constructivist grounded theory methods, incorporating sensitizing concepts that had emerged from the literature review. These methods—with a constructivist focus on practice, ethnographic methods, comparative case studies, and grounded theory analysis (see Table 1 for an overview)—were each necessary to engage with Illich's concept of the convivial tool, including the institutional and individual perspectives that are in tension in his theory.

Table 1 Research Design Overview

This research seeks to understand:	Research Questions	Power Enactments under Consideration	Hypothesis	Data Collection Methods	Data Analysis Methods
How do public library institutional discourses and practices, as well as individual discourses and practices, shape the conviviality of public library creative places for their stakeholders?	RQ1: What are the lived experiences of the stakeholders in public library creative places, specifically involving power? RQ1a: What are the institutional discourses and practices involving power in these creative places? RQ1b: What are the individual discourses and practices involving power in these creative places?	Institutional discourses Institutional practices Individual discourses Individual practices	Public library institutional discourses and practices (and those of the users of the spaces) determine the conviviality of their makerspaces for their users and communities	Content analysis of documents, budgets, marketing materials, emails, policy and procedure manuals, signs, directions. Participant-observation, Interviews with users, library staff, non-user community members, funders or partners, and community officials.	• Coding and developing codebook: Coding using sensitizing concepts and active codes from 5 interviews and multiple documents from each case. • Focused coding: Collapsed and synthesized codes, recoded the first documents, coded other materials—39 lengthy interview transcripts • Development of categories from the codes in two areas: naming factors that shape the conviviality of the makerspace as a tool for users or factors that participants identify as necessary for the space to be convivial (desirable traits of the spaces); and the major tensions in the shaping or enactments in the spaces. • Used categories to code last interviews and documents, while seeking new codes/categories emerging from the data and amending the categories as needed. This was done until a point of saturation was reached in each case and no new codes/categories emerged. • Review of all other interviews and documents to ensure that no new codes or categories emerge.
	RQ2: How can convivial tool theory intersect with these discourses and practices?	Institutional discourses Institutional practices Individual discourses Individual practices			

Ethical Procedures

This study was overseen by an Institutional Review Board (IRB) at the University of Wisconsin-Milwaukee, that determined that the participant solicitation, participant observation, interviews, data analysis, and storage of the data were all conducted ethically. Participants were required to be ten years old or older, to avoid any challenges in interviewing very young children. Consent forms were required for all participants.

The criterion for inclusion as a research site was that the director agreed to participate and gave their consent, that at least two staff members also opted-in to the study, and that the board of trustees approved the study in writing. These factors existed to ensure that I acquired enough institution-centered data regarding each case. They ensured that institutional buy-in was assured, and I was not an unwanted invader of library space.

The study was conducted on an opt-in basis, so that participants were not being observed by default, even though they were in a public space. I approached potential participants in a subdued manner by offering them a printed request for their participation and allowing them time and space to consider the matter. This allowed for free and uncoerced consent. Participants were able to opt into only some activities and were able to opt out at any time. The people who chose to participate in this study did so to further knowledge; there were no incentives or compensation granted them.

I anonymized the cases I was studying, as well as the participants, because the large urban library requested that they remain anonymous. I have anonymized the participating libraries to reduce any risk of identifying the research sites. The publicly available data that provided case study context for each site, such as budget numbers, may be used to identify sites, so I used ratios of per capita investments and ranges or approximations and other ways of reducing the identifiability of each site. Research participants were de-identified with pseudonyms to ensure their anonymity. No sensitive information was sought or recorded. Field notes and interviews were transcribed from the notes and recordings without any identifying information, using pseudonyms. The written notes and consent forms were kept on the researcher's person or in a

locked location at all times.

I photographed the spatial arrangements of the makerspace, the tools, and other areas of the library, with no people in these photographs. I also photographed participants using the spaces, the non-identifiable parts of the participants such as their hands or backs, with specific consent granted both in the consent form and at the time of the photography.

As noted in the description of the role of the researcher, interviewing and participant-observation tasks were conducted in a minimally invasive manner. Interviews were conducted wherever the participants felt comfortable. I never identified participants to other participants.

When describing the participants in the field notes and written report, I made a good-faith effort to approximate ages and genders. In the report and notes, I do include some assumed racial identities, with extreme reluctance. I recognize that race cannot be detected by looking at someone, and is a cultural phenomenon, not a biological one. When I felt the participant would be comfortable with the question (which was rarely), I asked people to self-identify any racial or ethnic identities they held. It was a sensitive question for some, and I avoided the topic in an effort to be congenial, and avoid alienating participants. Thus all of my guesses at racial categorizations are flawed, since they are made by the grossest of generalizations about skin color and other physical attributes. While I would prefer to avoid these generalizations, the issue of racial differences in the use of the large urban library were asserted by staff and many participants, and were apparent to me, and I attempt to be sensitive to these perceived differences. This is a limitation of this study.

Role of the Researcher

For the participant observations in this study, I was neither a fully embedded participant nor simply an observer. As LIS ethnographer Elfreda Chatman (1992) asserts, the observer and total immersion roles are problematic because, “total observation means that the researcher is not privy to motivational factors or to subtle influences affecting behavior...[or because] the researcher has given up an important measure of objectivity” (p. 3). The role of participant-

observer balances some claim to objectivity with the need to experience the culture for oneself. This role fosters a critical perspective on the practices in the space. In addition, as a former public librarian with makerspace and creative programming experience, I occupied a multi-level role within the organization. From the library staff's perspective, I was at times treated as a colleague or insider, and at other times viewed as an outsider, or a library user with *many* questions. I was sometimes treated as a subject expert, though I tried to dismiss this role whenever it was presented to me. The fact that I had prior experience in some of the types of activities I was investigating, and the prior research I had done, prompted some library staff members to inquire as to what I would do in a given situation. Since I wanted to avoid impacting the practices and cultures of each makerspace as much as possible, I deferred these questions to an exit interview on the final day of my visit in each space. Then I allowed the library makerspace staff to inquire about what they wanted to know. I was careful to answer in terms of my notes or interviews (preserving all participant confidentiality) or in earlier research.

My role in relation to the users was also varied. I generally inhabited the role of either a researcher, asking many questions, or a co-maker, creating things alongside them and observing. As a participant and observer in these library spaces, I took on many of the same roles as other users. In all three cases, I was either a “maker-in-residence” who formally demonstrated types of making through workshops, or I informally assisted people with their own making, as well as using the space to make projects myself. In this way, my role was little different from other user roles—in all three cases, users taught or shared information in the same way.

In the Welcoming and Responsive libraries, I occasionally acted as a leader of a fiber arts workshop, or as a maker-in-residence. This may have lent me a certain level of authoritativeness with the makerspace users, although I was careful to note that all the presenters of workshops were regular people with interests in making particular things, and mentioned that any amenable person could lead a workshop if they had a skill people were interested in. In the Productive Library, I was asked to help people with felting projects on an informal walk-in basis, and to assist with soldering and circuitry projects at events, so was less of an “authority” figure. At all

three libraries I sometimes inhabited the role of a peer-teacher when someone asked how to do whatever I was doing. Often, I inhabited the role of peer-learner, when I wanted to understand how someone else was doing something. These informal peer roles were also negotiated by many of the users of the space, with individuals often switching between roles during a single interaction.

Due to the variety of roles I inhabited in these spaces, I was able to capture some of the flavor of both emic and etic perspectives as a user and as a library actor in the space. However, I did experience what Lofland and Lofland (2006) describe as, “marginality... There can be a continual, often subtle, but always painful sense of separation between the observer and the observed” (p. 60). I was never an insider or an outsider, but attempted to straddle those roles as gracefully as possible.

Axiologically, a constructivist research method acknowledges that the values and biases of the researcher cannot be eradicated, but instead must be confronted and examined. As Cresswell (2007) states such research “includes his or her own interpretation in conjunction with the interpretations of participants” (p. 17). This research does just that, contrasting my own interpretations with those of the participants, and focusing on the differences and similarities between them. Thus reporting the findings of the study in first-person narratives is appropriate and necessary. Ethnographer Renate Rosaldo (1993) points out, “The ethnographer, as a positioned subject, grasps certain human phenomena better than others. He or she occupies a position or structural location and observes with a particular angle of vision” (kindle location 472). I occupy the position of former librarian but also a maker, straddling the lived experiences I study here. Prior to this study I knew things about these identities, though only through the context of my own lived experiences, which are very different from those of many of this study’s participants. I kept this fact in mind as I interpreted their expressions and practices.

In a similar ethnographic study of making and makerspace cultures in China, Lindtner et al. (2016) describe how such biases and value judgements interact with their analysis:

In naming and framing making as an object of inquiry, we ourselves end up

resourcing, judging, championing, inhibiting (and so forth) making. When we understand the projects and materials that appear in *MAKE Magazine* or at Maker Faires as exemplars of making, this is not an innocent description. When we justify making research because it stimulates economies or functions as a crowdsourced laboratory of the Internet of Things, this is not an innocent description. In each case we are contributing to the discursive formulation—and to the assemblaging—of making. This is a form of agency, of power/knowledge, that we have. (p. 1399).

The framing and pursuit of this study have also enacted a form of agency and power/knowledge. By often occupying a role of the situated “knower” of things about library makerspaces, I had to disengage with any understanding of this phenomenon and adopt a mien of “acceptable” or “strategic” incompetence” (Lofland et al., 2006, pp. 69-70), to encourage members of the group to help while reassuring them that I was both credentialed and sympathetic. For example, I tended to ask the question, “How was that decision made?” instead of “Why was that decision made?” to limit the impression that I was judging a participant’s choices. This was a deliberate choice to ensure that the participant felt comfortable in describing their own sense of agency and how they enacted it.

If unaddressed, researcher bias and assumptions can limit internal validity. Ethnographer Peshkin (1988) calls for a tamed subjectivity, well-examined, to avoid: “that which my own untamed sentiments have sought out and served up as data” (p. 19). He describes this examined subjectivity as a strength of good research, not a weakness. Therefore, I took pains to be reflexive during the collection, analysis, and presentation of data. In the interest of addressing my subjectivity, I acknowledge that I am a former public librarian and user of libraries, that I offered makerspace services in my library, that I have sought convivial power relations in my personal and professional life, and that I am an active “maker” within several artistic and technological areas, that I am a white, well-educated, queer woman from a working-class family. Unless evaluated, each of these biographical facts could engender biases or assumptions that study participants have similar values, or ascribe the same significance as I do to events, policies, or practices. I mitigated bias by using multiple methods of data collection to triangulate the data,

and to increase trustworthiness by using member-checking of drafts of the findings, practicing thick description and reflexivity. I used the concept of *surprise* to “make the familiar strange” to systematically decenter my own expectations of what should happen or was happening, exploring what was surprising each day. As Rosaldo (1993) notes,

Ethnographers begin research with a set of questions, revise them throughout the course of inquiry, and in the end emerge with different questions than they started with. One’s surprise at the answer to a question, in other words, requires one to revise the question until lessening surprises or diminishing returns indicate a stopping point. (kindle location 301)

I pursued these surprises, which revealed new questions. I took extensive field notes with many memos to work out any feelings of surprise, alienation, confusion, foiled assumptions, emergent understandings, and so on.

Data Collection

I collected data in the field between April and October of 2016. I followed up by sending abbreviated reports to people at the field sites in April-June 2017 to get their feedback, comprehensive reports in September 2019, and full chapters in March and October 2021. This section will describe the ethnographic methods I used to collect the data, the participants, and the cases under investigation. The aim was to understand culture (as the participants live and present it) as fully as possible given the constraints of time. The research procedures involved lengthy engagement with each research site on a near-daily basis for over 125 hours at each site, for a total of 403.75 hours of observation. I inhabited the creative places of each library for at least four weekdays and one weekend day each week for four or more weeks. During that time, I participated in classes and events occurring within the space and used the tools to create projects in the space. I was a maker, making within the space. I observed the activities of the other users in the space in a non-intrusive manner, after introducing myself and my study and gaining their consent. I also observed library board meetings, city governance meetings, staff meetings, and training sessions. 92 participants were observed in the space, with consent, including both staff and users. Many others were observed in interactions with staff or space, but without consent

forms I did not report on them other than in a general way. I was able to help with, learn from, and participate in many participants' projects. I observed interactions between patrons, staff, or tools and materials, and many combinations thereof. In addition, I interviewed 115 people (many of whom I also observed) either informally or semi-formally, to learn what various stakeholders and users thought about the spaces, tools, communities, and what they were able to do with them.

Participant Observation

To observe participants, I placed myself at the edge of the spaces, to ensure I could see the widest array of people in the spaces, though I did move around from day to day. I would set up my small sign stating that I was a researcher (Appendix F), the project I was working on that day, and my consent forms, recorder and note taking materials.

When I was in the public areas of the library, I could have collected data on anyone entering the spaces, but I decided, for reasons of research ethics, to exclude those who did not opt in to the study. Thus, the people who did not sign consent forms are represented in my field notes in very broad strokes: the "attendance" counts that listed how many people were doing things in the space, and what they appeared to be doing in a very vague sense (e.g. using a design computer, using a sewing machine), general descriptions of interactions with staff members for whom I had consent to observe them, and overall movements in or around the space if they seemed unusual, or in a group context. For example, when I saw a woman act unusually in the space, I wrote, "A young dark-skinned woman looked perplexed as she entered the space. I saw her reading the sign outside the glass wall surrounding the area. Her eyes traveled around the room, resting on one of the 3d printers for a long moment. She seemed to be sweeping her gaze around trying to locate something or someone. After a few moments of standing in place and looking at the room, she shook her head slightly and left" (*Field Notes Productive Library*, 5/12). When a group came to tour one of the spaces, I took notes on the group's general composition (i.e. older adult men), their overall movement around the room, their pauses in front of

particular spaces, tools, or activities, and what staff members were saying, but I did not record their questions or comments (e.g. *Field Notes Welcoming Library*, 4/13). This was to ensure library users had some privacy, even though they were in a public space.

For people who consented to be in this study, I observed their activities more closely. I noted how they used various tools, when they asked questions or appeared at a loss, and when they appeared confident. At times I asked them to talk aloud as they worked with a tool, to see what they were and were not able to do, and how. They shared any previous experiences in the space with me and spoke of future plans. This discussion could be “talk in action,” or just commenting and discussing what was occurring, or it could entail “casual interviewing,” in which I often elicited information by making comments rather than questions (Lofland et al., 2006, pp. 87-88). I watched their interactions with library actors and other users when possible. I took notes of what I saw and learned. All of this was outside of the more intensive interviews, which were usually audiorecorded.

Interviews

Semi-structured interviews allow for an in-depth exploration of the participant’s perceptions, observations, reasoning, interpretations, stated values, and descriptions of their practices, and align them with others’ through similarly-organized questioning (Weiss, 1995). It allows participants to expand on current interactions through the context of previous experience. When users, library staff members, or other stakeholders consented, I interviewed them either informally on their use or understanding of the space and the projects they are working on, and/or I used a semi-structured interview script, depending on their availability to speak at length. Some of the participants spoke to me more than once. The main person in charge of each space spoke to me twice, once at the beginning of my tenure in their space, and once at the end. These were the longest interviews I conducted.

Overall, I interviewed 21 library staff members, 6 trustees, 5 people from partner agencies, 2 city officials, 25 makerspace users, and 6 non-users in interviews using the semi-structured

interview script. There were 66 semi-structured interviews in total, involving 65 participants. Three people were interviewed twice, and two interviews involved two participants interviewed together. 48 of these were audio-recorded. 17 participants either preferred not to be recorded, I did not have recording equipment with me when I spoke to them, or I felt it would interrupt the flow of the interview to record. In two interviews, the audiorecording equipment ceased to function partway through the interview, and the rest of the interview was reconstructed from the notes.

The recorded semi-structured interviews took between thirteen minutes and two hours and twenty minutes to complete, with the average length of a recorded interview at 46.4 minutes. I recorded the interviews according to IRB protocols, and with participant consent. I transcribed forty of the recordings with accompanying notes on significant non-verbal cues, demeanor, pauses, interruptions, or other contextual information. An additional seven interviews that were recorded only through notes were included in the initial coding. The semi-structured interviews which were not audiorecorded generally took less time, between 15 and 35 minutes each. These interviews were transcribed from notes and reported in the field notes, which were also coded. Once the analysis had reached a conceptual saturation point, and no new codes or themes seemed to emerge from the data, I ceased transcription. The final eight interview recordings were not transcribed in total. They and the less-extensive interviews in the field notes were examined for additional or conflicting viewpoints, or notable examples of existing categories. Two of these were subsequently transcribed in part, and new data from them incorporated into the coding schema.

I spoke informally to an additional 53 people in casual, unstructured interviews that occurred during participant-observation. These conversations were based on a participant-observer basis, one user to another, although participants were informed about my research goals and signed consent forms. Most of these conversations occurred in the creative places, often as we worked together or side-by-side on projects. The conversations lasted between five minutes to half an hour. The majority of them were around fifteen minutes in length. These conversations

are recorded in the field notes.

The more formal interviews addressed the research questions more directly, in an interviewer-interviewee relationship (see Appendix G for sample interview questions). These interviews explored the participants' descriptions of library creative place governance and policy, interactions in the space between other patrons', staff, and the tools, any sense of power the participant described, and how participants assumed this power to be limited and/or facilitated by these interactions. The interviews also explored the participant's understanding of the utility of libraries in our culture, and what sort of faith they hold in library services in impacting them individually or socially. In addition, the interviews asked how the participant rhetorically aligned their understanding of the library faith, or what libraries were for, with the activities and services in the context of the spaces. The casual, informal interviews were to understand how users were understanding and using the space in specific contexts.

Fieldnotes

Fieldworkers transcribe and translate their experiences into field notes, with context-rich narratives written and organized to provide memory aids for later writing, vivid descriptors, ongoing analysis, and pattern recognition. Different methods of capturing field notes range from intensive note-taking in the middle of events to an after-the-fact procedure. I combined these methods. I jotted down brief notes as I observed and interviewed participants, and filled in more intensive notes afterward, while the information was fresh in my memory. Each evening I transcribed the day's field notes, fleshing out the initial jottings further and taking note of my own reactions and thoughts as I went. These final field notes combine my observations, and brief interview transcripts. In addition, I captured photographs of projects, spaces, and some interactions, taking care to preserve the anonymity of the participants (for example, I would take a photo of a persons' hands while working).

These notes also contain memos of my thought processes, concerns, and ideas throughout the fieldwork. They contain the surprises I noted each day as I observed and spoke to

participants. The fieldnotes are not only the main way in which I gathered observation data, they were also crucial for reflexive self-checking as I interacted with the communities and made connections between earlier and later experiences (Whitehead, 2005).

Case Study Data

For each site, I collected budgets, policy and procedure manuals, emails, and planning documents relating to the creative place and how it evolved. I collected marketing and training materials created by the library staff. I also collected journalistic reports on the spaces. In two of the cases, I was able to acquire spatial plans or architectural drawings. I also collected some equipment information, as relating to the creative place. I gathered annual report data from the year prior, and library board reports, as well as available statistics on creative place usage. I also collected marketing and training materials created by the library staff.

Participant Selection.

This IRB-approved study involved identifying potential case study sites in January-March 2016, and finalizing field site selections April-May 2016.

Identifying Cases.

I assumed that my preliminary work in identifying field sites was exploratory in nature. I looked at sites across the country—both those identified by the website created by University of Michigan researcher Kristin Fontichiaro (2015), and those I had heard about through word-of-mouth. I began to identify potential research sites to study based on the following criterion:

- Variability in:
 - Community size;
 - Geographical locations in the United States;
 - Tools and materials in the spaces, with some “high-tech” and some “low-tech” tools in each space;
 - Ages of the users;
 - The length of time each space had been open;
- Uniqueness in each site in regards to some of their tools;
- My ability to relocate to those spaces for a month or longer.

As I looked at the various makerspaces in the map provided by Fontichiaro, I focused my assessment on the variety of tools on offer, the sorts of programs offered, the development of the websites for the makerspaces, and whether the spaces allowed for at-will use by a variety of ages. I then selected some candidates for study. As I did so, I also reached out to my network of family and friends to see if there were possible places for me to stay for a month or longer near the potential field study sites.

For example, I selected the urban libraries Productive Library⁷ and a library in Tennessee as possible spaces for study, but preferred Productive Library due to the inclusion of an Espresso Bookbinding machine. I hoped to see how printing books for local authors occurred in a library makerspace context. These two possible cases were the largest makerspaces in public libraries, and I wanted to include this size of community in this study, since several cities were in the process of creating their own makerspaces, such as San Francisco and Columbus, Ohio. Productive Library was identified through the library professional literature as the largest public library makerspace in the country, at that time. The Tennessee library space was smaller and had fewer types of tools available.

Another library appeared as ideal sites for my needs: Welcoming Library, a very small library located in the Northeast with a woodworking shop. The Welcoming Library was located in a geographically-limited search for a small library offering makerspaces in the region. A family member who offered a place to stay as I did my research suggested several libraries in the area who offered such services. The realities of long-term research require a place to stay, and the inclusion of potential small-town libraries in the Upper North East was welcome in terms of locating geographically-variable sites. When I learned of Welcoming's woodshop, I determined that this extraordinary offering (I know of no other library makerspaces offering a full woodshop) could offer some needed diversity to the case selections. Other nearby libraries had

⁷ These names were selected after the data was analyzed to represent a key aspect that participants described in their use of the spaces, to evoke a sense of what the users of the spaces experienced in them. This naming was done at the urging of an early peer-reader of the findings. Prior to the analysis, the cases were called Case R, Case H, and Case K, with the initials of the pseudonym of the library directors.

smaller, less comprehensive makerspaces, or spaces aimed only at serving children.

The third case was Responsive Library, a library in a small city/suburb in the upper Midwest with a Community Kitchen. Responsive Library had been a hoped-for candidate for study. I had sat in on five Advisory Council meetings as the library worked with the community to build the space, starting on March 19, 2014. I was unsure if the makerspace would be open in time for me to include it in this study, nor did I know if they would be interested in joining this study. Yet it would include a combination of “standard” and unusual equipment for a library makerspace, including a kitchen. This was a convenience sampled case, since I had knowledge of the process of creating the space.

These sites were targets at first; I wished to study in sites much like them. However, I anticipated a lengthy search for sites that would allow a researcher to study them. I was surprised when, in reaching out to Welcoming Library and Productive Library, I received immediate and enthusiastic invitations to join them. My target sites became, overnight, my actual sites of study. I did not need to seek out further potential cases, because the ones I first identified were willing to work with me. These were convenience sampled cases to be sure—but also purposively sampled to ensure I was examining a range of spaces. The criterion by which I had identified the ideal sites was selected from the literature review, and from earlier research investigating public library makerspaces and the ways in which they were understood by those offering and designing these spaces. In my exploratory studies, the size of the community appeared to shift what was perceived as possible in the spaces, with the smaller libraries interpreting the concept of “makerspaces” more broadly than larger libraries. In addition, the age ranges of users in the spaces appeared to accompany different perspectives on library services, intellectual freedom, and access, with a broader range of ages corresponding with an inclusive “convivial tools”-type of mindset. While the exploratory study was limited in its participants, the thirteen interviewed librarians highlighted these criteria as important to ensure I captured the widest possible range of making practice and discourse in a limited series of case studies.

The literature review also highlighted the variability and uniqueness of each library

creative place, especially in terms of tools, programs, and users. The diversity in geographical locations criterion aimed to increase transferability of the study to include different funding structures, regional variations in use, and different demographic factors in the community. At the same time, a wide array of tools and programs was also a criterion to ensure the broadest transferability of the findings to a variety of public library creative places. Each space was open for a different span of time, which offered me the potential to see how the spaces evolve over time, and how the discourses and practices in the spaces might change.

The unique factors that emerged in each case allowed me to observe practices that may not be transferable to a wide range of spaces, but allowed the local flavors of each space to shine. Each community tells a different story as to why these spaces are necessary, and what tools are needed. These criterion balanced a need for widely-applicable and potentially transferable findings with the local and unique ecosystems in which each space evolved.

Finally, the criteria that allowed me to relocate to the area for a month or longer was based on simple physical necessity. In communities in which there were few affordable housing options, or lengthy commutes were required, I could not expect to spend enough time to investigate each case without a place to stay. Welcoming Library, for example, which stood out above a couple of other small library contenders due to its woodworking tools, was also ideal because I had a place to stay nearby. This means that in at least one sense, these are convenience-sampled cases. Nevertheless, the convenience aspect of the sample was minimal in comparison to the purposive criteria of variability. This purposive sampling method played out again in my selection of the individuals I sought to interview.

Each of the above criterion were deliberately selected, while others were not. For example, since I did not expect to focus on racial or ethnic issues, I did not focus on racial or ethnic demographics as a criterion, though I did encounter variability in this regard. I did not focus on the income variations of the various communities, even though the working class ethos of making (and making do) was present in the literature review (e.g. Gauntlett, 2018; Maxigas, 2012; Tanenbaum et al., 2013). Nevertheless, I encountered variations in economic indicators in each

community, although each of them could be identified in some way as economically struggling. Other criterion were acknowledged but not pursued, such as the amount of community-based governance of the space. I could not ascertain in advance how much community-based decision making occurred in the space, so abandoned this criterion. In the end, I encountered some variability here as well.

Identifying Individual Participants.

In each case, some participants were necessary for the study to be possible. The people who ran the space were important informants from the perspective of the institution, with the best knowledge about how and why the spaces were created, the happenings inside the spaces, and the future plans of the spaces. In Welcoming Library, the library manager was also the lead staff member in charge of the makerspace. In Productive Library, the duties of overseeing the space were split, with one person overseeing personnel and scheduling decisions, and the person who reported to him acting as the de facto manager of the space, or the “team leader.” In Productive Library, the library’s Information Technology director was placed in charge of the space, but he worked closely with a part-time newly hired staff member, who operated the space most evenings. Without the participation of these library administrators, I would not have chosen these sites to study; they were insurmountable gatekeepers of the sites. Other than these key informants, I selected participants using a snowball entailing asking each participant to suggest further participants., or a convenience sample of those willing to speak with me.

In addition, I purposefully sought people in particular roles, to ensure I was gathering a range of perspectives in each case. This did involve convenience sampling, selecting participants who were both available and willing to speak with me. I sought to interview any staff members who were willing to participate. I was able to speak to library staff that operated outside the purview of the creative place in all cases. I attempted to speak to people at the highest level of the administration as well. In two cases I was able to converse with the director or manager of the library and trustees. However, in Productive Library I was not granted access to the Director, and

spoke instead to the Deputy Director. Nor was I granted interviews by library trustees, nor the president of the Friends of the Library. I was able to speak to top city officials in the two smaller communities, but not in Productive Library. The mayor did not return my call.

I was able to speak with people who partnered with the library, from the community or non-profit organizations in each case. In Welcoming Library, several partners from local foundations, the community center, the library system, and schools spoke with me. In Productive Library, I was able to speak to the Poet in Residence at the library, who was also a professor at a local state university. In Responsive Library, I spoke with two people in their joint roles, one as both trustee and arts board president, another in his capacity as city and county board member and as a member of the local business owner's cooperative.

I sought out as many users of the creative places as possible to speak to. If a person didn't seem too engrossed in their project, or if they made friendly eye contact or greeted me, I explained who I was and what my study was about. Many of these people were too busy to speak with me at the time, though several returned to speak to me later. Others were able to spend ten or fifteen minutes talking, but could not commit to full interviews.

I did not gather specific socioeconomic details from each participant unless it seemed particularly relevant. These questions felt too intrusive, when I was already requesting each participant to volunteer their time and energy toward this study. Thus, when I describe age, gender or race of the participants, I am generally guessing. I rarely asked people how they identified, or how old they were, instead reading the visual clues their persona expressed. These guesses could be wrong, and fault is mine if they are. In the future, I will always ask, to ensure participants have agency to describe themselves as they see fit.

I wanted to get insights from people who did not use the library or library makerspace. To that end, I chatted with people on the street, in coffee shops and restaurants, local businesses, and bars. While most people were willing to talk briefly, few were willing to take the time to do full interviews or to sign consent forms. Nevertheless, I have lengthy feedback from two or more people in each community who do not use the makerspace, fund it, partner with it, or in any way

interact with it, though one makerspace non-user in each case does use the library in other capacities. I also have shorter conversational data from an additional six library or makerspace non-users. Although I attempted to gather a broad range of perspectives, the participants I would have liked to speak to did not always have time or interest in speaking with me.

Data Analysis

While I was still in the field, I began to analyze the data using constructivist discourse analysis inspired by Charmaz's (2014) grounded theory methods. I had constructed an initial incomplete list of potential codes of sensitizing concepts from the literatures on power theory, conviviality, and makerspaces. Charmaz says that these:

sensitizing concepts and disciplinary perspectives provide a place to *start*, not to *end*. Grounded theorists use sensitizing concepts as tentative tools for developing their ideas about processes that they define in their data. If particular sensitizing concepts prove to be irrelevant, then we dispense with them. (p. 17)

In this manner, an initial list of questions and sensitizing concepts emerged from the literature review on power and convivial tools. The 92 sensitizing concepts comprised a rudimentary codebook. However, the sensitizing concept schema was refined through comparison with what was emerging from the data.

Processes of Coding.

Initially, I began using NVivo to code the data while I was still collecting it in the field. However, due to a significant lag in using a remote connection to the campus' licensed copy of this software, and a challenge interacting with many codes, this software was discarded. I then coded using a series of abbreviations and colored markers, directly on printouts. When I began the categorization process, I copied the coded documents, disassembled them, and sorted them into piles. This process, while low-tech in nature, allowed me to see all of the applicable quotes for a category at a glance, and eased the analysis process. In the end, these categories were written on envelopes, the cut-up notes were placed inside, and the envelopes were arranged spatially to allow me to see the connections between each category. This version of coding was laborious, but

I could make quicker, more intuitive connections using my hands and slips of paper than I could on a computer screen.

I started with an intensive idea-by-idea coding and analysis of key interview transcripts, a selection of policy documents, the field notes, and some of the public relations materials in each case, using and developing both the initial codes and creating new codes as needed. I coded idea-by-idea, as a line might contain a few words or many, depending on the structure of the document I was analyzing. Moreover, a line could comprise many concepts, whereas smaller “ideas” were more focused. An idea could encompass more than one code, as I attempted to capture the nuance of each idea. The codes were expressed in active verbiage, using gerunds to highlight the processual nature of the activities in the space. This aligns with Kathy Charmaz’s (2014) constructivist grounded theory methods. In this method, the active construction of practice is highlighted by a focus on what is occurring in the data from moment to moment.

I initially coded the materials by rephrasing the actions as they were described in the data as active codes, while keeping an eye out for any sensitizing concepts. I coded five documents from each case in this way, including the field notes, key informant interview transcripts, and a policy document. However, as I sorted and recategorized these codes it became apparent that to code all these documents in this manner would be both more time-consuming than was possible, and beyond the scope of this project. I found that large portions of the interviews and other documents were not about power enactments specifically, so I ceased coding things that were simple descriptions of who the participant was, or their history, unless it was applicable to the research questions. The first pass of coding used the 92 sensitizing concepts (see Appendix C), allowing additional *in vivo* codes to emerge. Many of these sensitizing concepts were either not visible in the data, or could be combined and re-named to more closely reflect the data, as focused codes. Other concepts were not in the original list of sensitizing concepts, but emerged from the data.

I then formulated a code manual from the focused codes that had emerged from the data in the first round of coding. In this codebook, I discarded any codes that were not about power

enactments, retaining the codes that focused upon that referenced a decision, choice, action, or other power enactment, as well as feelings and sense-making, relating past experiences, and hopes for the future. As Charmaz (2014) notes:

Focused coding expedites your analytic work enormously without sacrificing the detail contained in your data and initial codes. This type of coding condenses and sharpens what you have already done because it highlights what you find to be important in your emerging analysis. (p. 138)

Using this focused coding manual, I recoded the first documents, and went on to code further interview transcripts and other materials—3 sets of field notes (which included interview quotes from 53 people), 3 policy documents, 9 marketing material documents, and 39 lengthy interview transcripts—until I found that no new codes or categories were emerging from the data. I had to return to earlier coded documents several times throughout the process when new codes emerged, to ensure that I had not missed anything, or to reassign codes that more closely matched with what was occurring. Seventeen additional interview transcripts were then coded at the category/theme level, rather than idea-by-idea or at the code level. This was done to ensure that no new categories or codes were emerging. When I was satisfied that the analysis had reached the saturation point, I stopped the analysis. This meant that nine interviews were not coded, though they were replayed or reread several times to see if there were new codes or categories that would require examination.

At the end of the coding process, 75 codes were organized into themes (see Appendix D for a complete codebook and examples of each code.) The codes that emerged from the data were those that could address the research questions; I focused on events, statements, and practices that had something to do with power and conviviality. Other data was coded to analyze the rhetoric of how and why the spaces were expected to work. In this analysis, I focused the coding on parts of documents that described what people could or could not do, how they felt about it or how they understood it, how they made decisions, and what they thought about libraries, makerspaces, and the things and communities they included. The analysis largely ignored issues such as the precise processes through which people learned in the space. The methods of learning

were not the focus of the research questions, so that I may explore that data in future projects.

However, this data could not be entirely ignored. For example, I did not initially closely attend to events or processes such as “sensemaking,” though that code swiftly emerged from the data. Since I had been unaware just how significant sensemaking processes were to the power enactments in the spaces, the research questions had not addressed issues of sensemaking. As the code of sensemaking emerged, accompanied by the category “Exposure - Framing,” I realized that I would have to go back and examine the “sensemaking” coded data for subcategories of how, when, and why that was accomplished so that the “Exposure - Framing” category would be illuminated. I then added subcodes to determine what was responsible for some of the processes of sensemaking, such as staff behaviors or personal dispositions. These subcodes were applied where appropriate for the codes. Coding was thus recursive. Some inductive codes expanded, while others merged to become categories.

Categorizing the Codes.

After an initial body of documents was coded, I began to sort these initial codes into categories highlighting the expressions of power, and tensions visible in the practices with the creative places. This type of analysis allows for what Charmaz (2014) calls “theoretical sampling,” which is “a strategy to narrow your focus on emerging categories and as a technique to develop and refine them” (p. 205). It allowed me to see what sorts of new questions might need to be asked, or new participants sought.

This step of the analysis sought to uncover conceptual configurations or linkages. As the data was coded, and often re-coded, I searched for patterns among the codes. This process occurred alongside and after the coding process. Some codes were collapsed into a category, others were expanded (as with “sensemaking”) and then incorporated into still-larger categories (for example, “Sensemaking” and all its subcodes now reside in the “Exposure - Framing” category). These seven categories are the grounded theory findings of this study.

As I began to see emerging categories, I began to code the bulk of the interview

transcripts and some of the marketing and other documents using the broader conceptual categories, while always keeping a sharp eye for new information or data that contradicted or expanded the categories. At times I returned to coding idea-by-idea, as new information came to light, regarding power or conviviality.

This was an iterative process. I began coding at a fine granularity, with codes—sometimes several codes—affixed to each overall idea (whether it was a sentence, paragraph, or phrase). As I changed, merged, or added new codes, I returned to documents I had already coded to see if I could find any evidence of this shifting understanding. As I progressed in the coding, I continued to code at the level of “idea” but instead of coding each idea with one or more of the seventy-five initial codes, I started to code them at the level of category. The categories shifted, melded, and developed throughout the analysis through the process of constant comparison. Constant comparison of each conceptual category allowed me to code the bulk of the data at the category level. During the process of category-level coding, I kept a sharp eye for any new data that would require additional codes, categories, or amendments of earlier versions of the coding schema. This process shifted four of the conceptual categories to be more inclusive and descriptive of the range of experiences in these spaces.

Seven categories settled into place. These were the seven tensions that existed between the power enactments of individuals (including library actors as individuals) and the institution. In addition, this analysis informed a theoretical model about what a convivial tool would look like to the study participants, including the seven powers or capabilities they expressed as important, occurring, or missing in the spaces and their practices. The tensions and the capabilities overlap—often the need for particular capabilities became visible through ongoing tensions over institutional and user aims. At one point in the analysis of the data, I had an eighth tension mapped out called **Control – Help**, but I realized that it was already encapsulated in the tensions of **Trust – Doubt**, and **Subject – Object**. Control arose when the library staff or other patrons doubted the safety or abilities of others, and help was one way to express that control, as well as a real attempt to alleviate any gaps in someone’s intellectual access. Control also was visible in the

Table 2 Example of analytic steps, from data to theme

Tension/Theme	Condensed codes	In vivo codes	Example quotes
Communal - Individual Benefits, uses, or problems of the space for individuals or for community or social impact. This theme describes the communities or groups for whom the space is intended, and who uses it. It describes tensions between individuals using the space and the need for the space to serve the entire community, and how those tensions are negotiated in practice. In addition, it describes how people formed social relationships in the spaces, felt or did not feel they were part of the community in the spaces or libraries, and what value they placed on social making, or community engagement.	Wanting to form or develop relationships (h, b, d, i, m)	a. Relying on others b. Forming relationships	"I like this library in particular, because this library is for coming in, and talking to the ladies in the front desk about what is going on in town. It's about coming in and finding out what just happened on 96, just having a cup of coffee" (Megan). Coded b, i
	Identifying individual needs of space as important --And/Or-- Identifying community needs of space as important (e, k, l)	c. Wanting to see what others do	"so two of the machines we had at the very beginning on the floor that I really liked were the EggBot and the WaterColorBot, right? So those were super fun. They were accessible. Kids could do them. We quickly realized they would not work on the floor mostly because... I mean they're made of like little pieces of MDF board and string, right? So one wayward child can rip apart the machine and then it's down for however long until my staff can fix it. So those almost immediately came off the floor... almost immediately. I mean I think maybe they were on there for a month. They were like... No, these were a program only thing" (Jenna). Coded f, j
		d. Feeling connected/wanting to connect	
		e. Wanting to be left alone	
		f. Worry about user behavior	
	Describing the need to share resources that are expensive (j, f)	g. Fighting over tools	"I remember that morning coming into barcamp, sitting down in the big open space, looking around and feeling like, 'these are my fucking people.'" (Olivia) Coded h, d
		h. Finding one's "people"	
	Wanting to see what others do in space, or enjoying others' making (m, c)	i. Connecting with community	"I don't think it's fair that you got one person who's reserving the vinyl printer for six weeks out every day at such and such time, I think that's unfair to block that from everybody else... The problem is they don't show up everyday. And then we have people fighting over the time frame when it's open. But there's no... There is no perfect world. Even if we get this new software and reservations, that's not gonna stop a lot of that stuff." (Chuck) Coded f, g, j
		j. Identifying problems with sharing	
	Describing problems/delays around sharing space or tools (l, j)	k. Describing benefits for individuals	Cassandra described how happy and accepted her daughter felt, and that she had worried that Dahlia's high energy would be in conflict with the adult needs in the space. Instead, they felt like they had found "their tribe" (fieldnotes 4/25) coded h, j, l
		l. Trying to behave "correctly" around others	
		m. Wanting friends in the space	

institutionally-centered worldview that I will describe in **Subject – Object**. The codes for **Control – Help** were thus resorted into the other 2 categories. The final analysis, in which all three cases were compared, occurred during the writing process, as the codes, categories, and examples began to form a picture of all three cases.

The final seven categories were used to code transcripts and documents until conceptual saturation was achieved. When no new nuances of the theoretical categories appeared to be emerging from the data, I ceased coding. I did a final check of the uncoded documents to be certain no new properties of the categories, or new categories, were present. If there were nuances in the document, I coded those at the category level. However, no changes to the categories were necessary during this phase of the analysis.

These final seven categories describe how the practices in and around public library creative places limit, or in some ways expand, the possibilities that the spaces can be convivial tools for their users. They describe the capabilities that were identified as important to ensure conviviality, and the tensions between institutional and individual perspectives and power in impacting these capabilities.

Member Checking

“Convivial tools are those which give each person who uses them the greatest opportunity to enrich the environment with the fruits of his or her vision,” Illich states (p. 21). Thus, member checking is the ideal to ensure that the participants in a study have the opportunity to ensure that their voices are heard, and that the fruits of their visions are being adequately articulated (Carspecken, 1996). The research itself becomes a convivial tool when it is participatory in this manner. Unfortunately, few participants engaged with member-checking activities. Three drafts of the findings chapters were sent to the people in charge of each of the field sites. I hoped for comment by anyone who participated in the study. Reports were also uploaded to the study website—and all participants were given the address for that site when they consented to participate.

In response, one person in charge of each of two of the study sites replied, amending none of the findings. One person requested additional anonymization to occur for one quote and mentioned that he felt nostalgic for the time discussed in the findings, when the space was new. In addition, he was sad to note that there were “parts that pinched my fragile ego” (Justin, head of makerspace in Responsive Library, personal communication, 3/11/21), but also, “I really do love the way you think,” meaning the researcher. He did not dispute any of the findings. When examining a near-final draft, the same participant responded to a question about any change in practices, saying, “The overall practice of planning with flexibility in mind and starting as open as we can and implementing restrictions based on demonstrated need, is basically the same. Things continue to evolve in terms of the daily minutiae” (Justin, personal communication, 7/7/22). The director of the Responsive Library also responded, with no amendments, but a request to see later drafts. I had also presented early findings from this research to this field site’s staff, on March 1, 2018, and Justin’s response was:

It was just what I was hoping for. A big dose of "why"

I know the Idea Studio crew got a lot out of it, and I'd like to think the rest of the library got some insights, blank looks notwithstanding. (personal communication, 3/1/2018)

The director of the Welcoming Library, who was newly hired and had not been a participant, forwarded the findings to those who were, but I did not hear from them until much later, when they declined to amend the findings (personal communication, Sue, assistant manager of Welcoming Library, 8/3/2022).

No one responded from the third site, the Productive Library, despite repeated efforts to make contact. No participants commented on the website, though there were four downloads of these drafts. I reached out to one participant that I know, who read the entire dissertation, and had no amendments to make and agreed with the findings: “Spot on. Reading the dissertation certainly reframed some of my understanding of the workings of the library... but everything you said matched my personal experiences” (Roger, personal communication, 7/11/22). Finally, I

reached out specifically to some of the library staff members to ask them to mention that the findings were open for comment. In the absence of contradictory commentary, I am proceeding in the *hope* that my findings correctly reflect the understandings of the participants. I can only assert that two participants have asserted that they read and agreed with the findings, and others accessed the findings and at least did not disagree (if they read the findings at all). The few comments I received were included as data and analyzed using the categorical codes that are described in the findings chapters.

Informal member checking occurred repeatedly during conversations and interviewing. I would regularly rephrase what I had heard a participant saying, and ask if I were understanding them correctly. I asked participants for clarification and an expansion of what they meant. For example, I asked, “You said that [Hannah, the librarian] pressed all the buttons. Do you mean that she didn’t let you push the buttons yourself?...What does that mean to you?” (Oscar, Welcoming Library).

Reporting Processes

Ellenhorn (1992) warns that the social theory of conviviality must be convivial (p. 79):

If we do not understand our theories as personal pronouncements of spontaneous encounters that are interwoven to our social and historical context, we fall into the trap of viewing our theories as holding a form of eminence. The theories, not our ability to create them, become the focus. (p. 78)

The findings chapters will first present narrative snapshots of each case. Each snapshot uses the words of the participants as much as possible, with additional narrative drawn from the fieldnotes, memos, and library documents. In each case, the pacing and use of the participants’ own words are different, reflecting the different participant experiences and roles the participants played in each space. These narrative snapshots are intended to capture a sense of the culture of each library’s creative place and community.

In reporting the words of participants, I use the following protocol:

- If there is a brief aside or other short phrase that does not significantly amend the statement being quoted, I use ellipses to represent the missing verbiage.

- If statements are separated by more than such brief asides, but relate to the previous statement, I start a new paragraph in the block quotation.
- If statements are not temporally one after another in the interviews, or are on different topics, I quote each separately.
- If the participant paused for a moment, I use an em-dash to indicate that pause.
- In the interest of creating a sense of the culture and practices in the space, I braid stories from different dates and events together in an overarching narrative. I note when one event or discussion happened before or after another.

I quote from my field notes and memos throughout the findings and analysis chapters, citing the date the notes were taken. When I gathered specific information from a participant, I note from whom in parenthesis, whether that information was from a formal interview, or more informal exchange as I observed and participated in the spaces. When I cite specific interviews, I place interjectory remarks I make (aside from the words “mmhmm” or “right” that encourage them to continue speaking) by noting an “S” and placing my remarks in italics. Non-verbal language is highlighted in brackets.

Limitations

For research to be trustworthy and useful, the researcher must protect both internal and external validity. As Erlandson et al., (1993) note, the person using the research must be able to trust the results (p. 160). Generalizability is the hallmark of excellence in quantitative studies, because it signals such trustworthiness. Generalizability involves external validity, and is the measure of the extent that the results of one study are credibly applicable to other situations. In a generalizable study, findings are plausible to various audiences, in various situations, and replicable for other researchers. However Guba and Lincoln (1994) note that generalizable facts, though long the goal of science, are not possible in ethnographic or other qualitative work. This is due to its idiographic nature; each case I explore will be different in some ways from all other cases. Guba and Lincoln describe two different sets of criteria to ameliorate limitations that allows a constructivist researcher to assess rigor in constructivist research. This set, they state, has been well-received:

...the trustworthiness criteria of credibility (paralleling internal validity), transferability (paralleling external validity), dependability (paralleling reliability),

and confirmability (paralleling objectivity)... (p. 114)

Therefore, this research has aimed at increasing the trustworthiness of the findings using Guba and Lincoln's framework of transferability and dependability.

Transferability

The delimitations set by the researcher for this study include the size of the study, the time spent in the field, and the location of the case study libraries. In addition there is a limitation based on the time passed since the data collection occurred; the world is different in 2022 than it was in 2016. As a result of these delimitations, this study has several limitations on the reliability and validity of the findings. The study is limited to United States libraries, where the public library makerspace movement is prevalent, although Canada and Australia also support a burgeoning makerspace presence in libraries (Bilandzic, 2013; Boyle et al., 2016; Christoffersen & Petersen, 2017; Wang et al., 2016), and such spaces are being developed in libraries in Europe (de Boer et al., 2015; Peltonen & Wickström, 2014). And this is an analysis of a moment that has passed, which may not fully reflect the present reality of such spaces.

Only three cases were explored in this study, and none of them for a very lengthy time. The purposive, convenience, and snowball sampling of cases and participants means they are not a statistically-representative example meant to describe or inform the entire population of library creative places or users. Instead, the research design rests upon the assumption that qualitative research can still provide findings transferable to other cases. The variability of the cases meant that each case may act as a synecdoche of a large group of similar cases (Creswell, 2007; Hammersley & Atkinson, 2007), to allow for the findings to transfer from these very specific cases to other similar cases.

Similarly, the participants were selected from a group of stakeholders in these public library creative places, and their individual perspectives are intended to be read synecdochically. While I tried to speak to the widest range of people working on the widest range of projects, these were self-selected participants who either value research enough to participate in it, enjoy speaking with strangers about their work and thoughts, or otherwise may not be representative of

the entire range of makerspace users in libraries. In the findings chapter, quotes or vignettes are selected from one of the many examples that illustrate a finding. When these quotes or vignettes are outliers, they are identified as such. Otherwise they are treated as synecdochical; one quote standing in for a body of similar expressions.

In regards to the data analysis, a primary assumption of this study is that an event-driven analysis can benefit from pre-existing theory—loosely applied, as Vaughan (1992) notes (p. 175). This study seeks to integrate the pre-existing theory with the data found during fieldwork. The analysis was recursive, and involved multiple levels of theory, moving from concrete item-level constructs, to patterns, to meaning (Maxwell & Chmiel, 2014), including finding patterns by synthesizing research literatures (Borman et al., 1986, p. 53). This process of testing and generating theory in ethnography is described by Geertz (1973) as a process of refinement, in which theory must not only conform to past experience, but must be applicable to unknown events in the future (p. 27). The testing of the theory occurs in the observation and interpretation of events, searching for “goodness of fit” (Geertz, 1973, p. 42; Schofield, 2002). “Fit” refers to the transferability of the analysis from the site of the research to other similar sites.

Credibility and Confirmability

Many of the issues of credibility and confirmability were addressed in the section of this chapter on the role of the researcher. Others were addressed through the discussion of the research methods themselves. I took great pains to allow the data to speak for itself in coding idea-by-idea with constructivist, active coding, and worked at exposing my own assumptions through the practice of memoing about surprises, and by querying participants about my understanding on an ongoing basis. I used member-checking to ensure that the participants agreed with my findings. Idea-by-idea, or line-by-line, coding acts as a natural corrective to researcher bias, as one is forced to confront what is in the data, rather than one’s preconceived notions (Charmaz, 2006, p. 81).

In all studies, qualitative or quantitative, the effects of participant selection or testing

effects (e.g. the Hawthorne effect) may impact the interpretations in a way that does not reflect the larger realities of others, or even the realities experienced by the participants themselves. I have recognized this limitation and incorporated that awareness into my analysis. To ameliorate the participants' sense of being observed and thus change their behavior, I did my utmost to put participants at ease, and to spend a long-enough time at each site that I became part of the scenery.

Access to the phenomenon under investigation, or the lack thereof, is a sometimes impervious barrier to study. Researchers sometimes must exploit their personal contacts to gain entrée into a subculture, which may result in conflicts of interest, or gatekeepers that limit interactions with a range of group members or activities. Researchers may gain access to a limited group of participants, who may not be fully representative of the group at large. This can flavor the research to the point that its internal validity suffers. Luckily, I had excellent access to the libraries and makerspaces in all three cases, although in Productive Library, I did not have access to all levels of the administration, the Friends of the Library, nor the Trustees. There were significant gatekeepers that barred me from full access in this case, particularly to the director of the library. This may impact the credibility of the findings regarding Productive Library; I was unable to gather the lived experiences of the people at the highest levels of the library decision-making processes. However, the similarities in all three cases supports the findings that emanate from one case. Across the board, the seven tensions emerged in each case, even as the way they presented themselves shifted.

Another challenge to the credibility of ethnographic methods is that they are difficult to learn, take a long time, must be practiced, and rely on more than careful use of theory and conceptualizing. "The credibility of qualitative methods, therefore, hinges to a great extent on the skill, competence, and rigor of the person doing fieldwork" (Patton, 2002, p. 14). The researcher must have strong observational skills, as well as access to the culture, which often requires an insider perspective, (Carey et al., 2002). My observational skills were honed during the months of participant observation, but I *was* new to this field. While I began this project as a novice in

ethnography, I had done several qualitative studies previously, which were supported by member checking of those studies. To mitigate these concerns about the credibility of the findings, I offered drafts of this study for member checking to ensure that it read as credible to the participants themselves. Such checking was minimal, which is a limitation of the study.

Dependability

To ensure the dependability of the findings, I practiced reflexivity as I gathered and analyzed data. Some researchers may be overwhelmed by what seems like a constant influx of unrelated data (Tan et al., 2003, 1.3, para 2). The act of imposing coherency on what may be incoherent phenomena, can over-simplify or normalize the participant's experience. To ensure the findings are dependable, the multiple types of data, member checking, careful field notes, memos, and idea-by-idea coding assisted in breaking down the data into manageable pieces that reflected what participants also felt was occurring in the spaces.

This study assumes that participants' described experience more-or-less usefully and truthfully represents practice. Language was not a problem; every person I spoke to spoke fluent English, so the language barrier did not come up as a limitation of the study. However, a potential limitation on the dependability of the study is that only people who wished to participate were included in the study, and some users of the spaces did not wish to participate, for a variety of reasons. I spoke to random non-users in the communities of the libraries—approaching people in cafes, or people who used the library but not the creative place. These non-users they were by no means a representative sample of the entire community. This limits what is knowable about the full range of users and non-users of the space.

Also, this study's interview methods capture participants' reported views. To counter this limitation, observation of consenting participants occurred, so that what people did was reported along with what they said. An allied limitation involved minors; they were interviewed only after they and their legal guardians or parents have signed consent forms, so it was not possible to conduct more informal interviews with minors during participant observation, since they were

often not able to obtain a consent form signature immediately, or even after some time. The participant observation data collection offered an opportunity to determine if the actual and described practices aligned. When the sayings and doings were disjointed, I attempted to rectify this through more conversation with the participants. When this was impossible, I memoed about potential discrepancies and why they might exist. When I speak of conjecture in the findings, I identify it as such. This increases the dependability of the findings.

Summary

This multisite case study uses the ethnographic methods of participant observation and interview to explore the ecologies of three library creative places, including: practices and perceptions of the use, governance, rhetoric, policy, and spatial and social arrangements in the spaces. Through the abductive process of constructivist grounded theory methods, the study inferred theory from practice, though it also used existing concepts of power to act as sensitizing devices during the data gathering and analysis process. These constructs include Illich's concept of conviviality, and other theories of power and agency.

The methods of this study reflected the needs of the research questions. To understand how people feel when interacting with the library, tools, and community in the public library creative places, these methods needed to ethically address the concerns of the people in those spaces, and to ensure their voices would be heard in the resultant study. These methods allowed for a transferable, credible, dependable, and confirmable understanding of how these creative places in public libraries impact their users' perceptions and processes of power and conviviality.

Interlude: Introducing the Findings

This interlude will orient the reader to the cases, participants, and resulting themes of tensions and capabilities in the findings. First, I will discuss the reporting processes for the findings chapters, as well as my participant roles within the reporting process. These sections are intended to assist the reader with a clear understanding of how I weave the narratives together, cite participants, and display the data in the findings chapters. I will then give an overview of the seven tensions that hypostatize a web of power enactments in the spaces. These seven tensions encapsulate the discourses and practices of the creative places and the people who can or do use them. Finally, this interlude will familiarize the reader with the basic demographics of each case, so that they can enter the worlds of each case with some basic understanding of the libraries and the communities they serve. More information is in Appendix A.

The narrative chapter comprises an ethnographic orientation to each library and its culture. After the narrative chapter, an analytic chapter highlights the grounded theory findings (e.g. Bloomberg & Volpe, 2019, p. 195), the tensions that emerged as categories or themes in the study and how they are enacted in each case, and the model of the power enactments in the space. From data about these three cases and the stakeholders involved in them, seven key tensions emerged as categories or themes of power enactments. These seven tensions lay out the range of helpful and/or problematic power processes occurring in these spaces. The tensions are:

1. Exposure – Framing
2. Access – Barriers
3. Trust - Doubt
4. Communal – Individual
5. Comfort – Unease
6. Subject – Object
7. Uplift – Fun

These tensions are not binaries or even spectra, rather they are inherent pressures that exist within practice. They are dialectics, which reflects my own early training in the Socratic Method at Shimer College. Each of them is the flip side of the coin of the other and is expressed alongside the other. They are generally inseparable, and sometimes are the same thing viewed

through a different lens, or they can occur simultaneously (like **Uplift – Fun**). Figure 2 flattens out a web of conjoined tensions, making appear linear the activities that were interconnected. On some occasions, they represent the tensions between an institutional and individual perspective, while on others they are simultaneously expressed by the same person. As Illich (1973) notes, examining institutional tensions can help to illuminate the sorts of radical monopolies that can become unexamined, invisible doxa: “By exacerbating the contradictions inherent in this institutionalization of values, majorities can more easily become aware of them” (p. 70).

From these tensions, seven affiliated capabilities also became visible. The seven capabilities describe what conviviality would or does look like to the participants in this study. These capabilities form a model of a convivial tool, laying out which types of power enactments are necessary to ensure convivial power relations in these creative places. I will discuss that model of seven capabilities in the Discussion chapter.

As noted before, the research seeks to understand how public library institutional discourses and practices, as well as individual discourses and practices, shape the conviviality of public library creative places for their stakeholders. Thus the research questions are:

RQ1: What are the lived experiences of the stakeholders in public library creative places, specifically involving power?

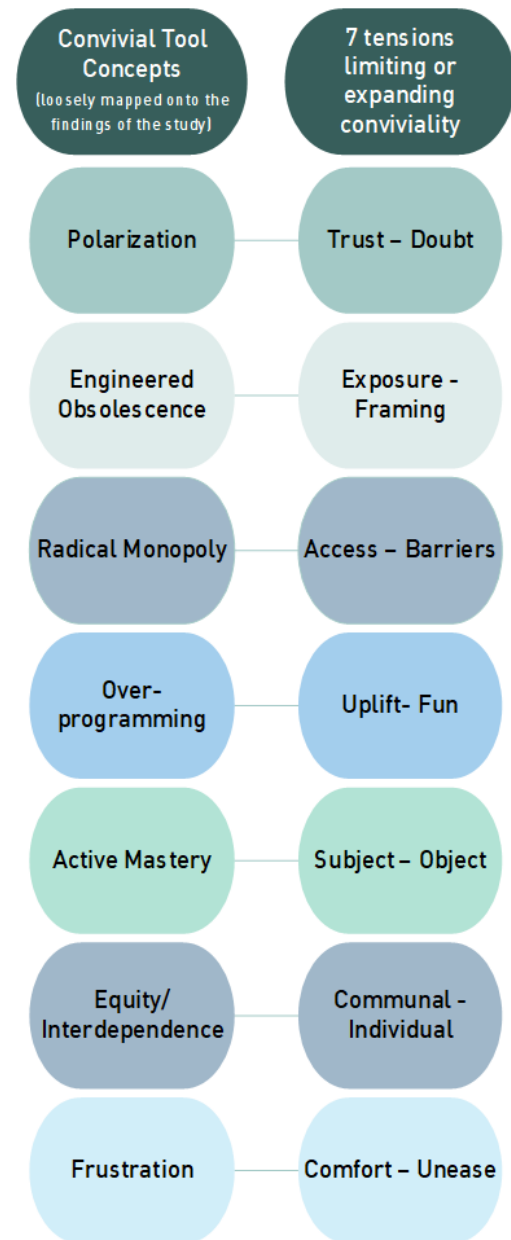


Figure 2 The Seven Tensions and Illich's Concepts in Convivial Tool theory

RQ1a: What are the institutional discourses and practices involving power in these creative places?

RQ1b: What are the individual discourses and practices involving power in these creative places?

RQ2: How can convivial tool theory intersect with these discourses and practices?

Through the narratives that follow in the next chapters, I demonstrate that these spaces are theoretically conceived of as convivial tools by nearly every participant in the study. However, the practices and discourses that most shape the conviviality of these spaces are largely institutionally-centered, so that these spaces are acting, in practice, as convivial tools for a small subsection of each community. Prior to this research, I had no clear expectations of what I would find in terms of power enactments, but I wanted to see if or how convivial tool theory aligned with the practices in the makerspaces. I found that the power enactments in these spaces are not as user-centered as convivial tool theory would suggest, but are more institution-centered.

The Seven Tensions

In this section, I will introduce these seven tensions between conviviality and institution-centered power enactments. These tensions demonstrate how the institutional practices and discourses shaped the potential of the spaces and impacted the users' sense of agency. They answer the research questions in describing the discourses and practices that involve power in the public library creative places. By briefly describing the tensions here, my intention is to assist the reader in seeing them in the narratives to follow. The analytic discussion of these themes will be depicted in typographic changes integrated within the narrative text.

Trust – Doubt

This tension exposes the complicated nature of social trust in the practice and discourses of public library makerspaces. Trust is like a stone dropped in a pool, causing all the resulting ripples of activity. Trust (and doubt) ripple from the very center of the library makerspace phenomenon—the central relationship in which either libraries trust their users enough to provide the creative places and tools, and the social networks that accompany them. Or they do

not, in which case they do not offer a makerspace, or they limit their use significantly. Users of the space trust the library, or do not use it. Without this basis of trust, the spaces and activity in them does not occur.

In this study, trust stems from the narratives that pinpoint for what and for whom the spaces exist, visible in the **Exposure – Framing**, **Access – Barriers** and **Uplift – Fun** tensions. It impacts the **Comfort – Unease** tension. It maps out the **Subject – Object** tension, positioning the user in these spaces, and exploring the extent to which the library actors trust their users, and examining how the users trust themselves to succeed, or trust the library and library staff to assist them. It is visible as a recursive loop in the **Communal – Individual** dynamic, in which people form social trust through relationships, and relationships through social trust.

The polarization Illich (1973) describes happens in the breakdown of this trust: “Society can be destroyed when further growth of mass production renders the milieu hostile, when it extinguishes the free use of the natural abilities of society's members, when it isolates people from each other and locks them into a manmade shell, when it undermines the texture of community” (p. 11). In this study, such polarizations occurred in breakdowns of trust or in doubt in the capacities of others.

Exposure – Framing

In interviews with the participants, some of the questions sought to elicit information about how each person perceived the space and its purpose, for their communities and for themselves. In nearly every interview, the respondent used the word “exposure” or a synonym to describe either what the spaces were for or what the spaces accomplished for them or the other users. This exposure emerged as an *en vivo* code in the development of these spaces in each community (e.g., Justin, Hannah, Richard, Sue, Jenna, Nick, Andrea, Robin, Wendy, etc.).

“It's about getting people exposed to these ideas or these creative outlets and allowing people to imagine the possibilities,” said Alan. Built into this concept is the assumption that communities are not aware of the creative or technological potential of libraries, tools, their

communities or even their own personal capabilities. They were audiences to be informed. This assumption turned out to be often true, as evinced by several of the users of the space, who worried that they had no concept of what they could accomplish or that makerspaces existed (e.g. Jack, Chloe, Alison, Linda).

Participants emphasized the beneficial economic outcomes made possible by the spaces (Garrett, Stella, Allison, Simon, Monica, Wyatt, Laney, Alan, etc.) and named underserved community groups to benefit. The groups included people without homes, people in poverty, people without jobs when manufacturing industries left town, or people without job skills generally. Also, participants assumed that teens and children would benefit from the existence of the space (if not the use, since children and teens rarely used two of the spaces). By framing the space as instrumental in skill and confidence building for these groups, study participants revealed their understanding of a library faith, or *imaginaire*. This *imaginaire* tells a story about why a shared resource exists, who benefits from it, and how that benefit accrues. What that *imaginaire* entails is examined in the **Uplift – Fun** theme.

However, just as film cannot be exposed to an image without it being framed by a camera's lens, including some things and excluding others, the exposure always materialized in a context of what the speaker decided was worth focusing upon. These framings privileged some types of activities and purposes as legitimate and authorized, (and are most visible in the tensions between **Uplift -Fun** as institutionally-acceptable goals of the work done in the spaces). As Illich (1973) states, "Institutions have not only shaped our demands but also in the most literal sense our logic, or sense of proportion" (p. 31). This logic drove the libraries' framings of the spaces and their use, and in turn fashioned users' comprehension of their roles. Hannah envisioned her space as a vehicle for creativity and problem solving. Jenna saw hers as a series of opportunities for individuals to apply knowledge they garnered on their own. Justin considered his space a "community creative space" with a heavy emphasis on the community. The sometimes-subtle differences in how the librarians framed their spaces steered the provision of services and tools, and the culture of each space.

Exposure – Framing, in these cases, grounds the existence of the spaces within a logic of making as entrepreneurialism and innovation. The institutional actors less regularly situate the activity of making in terms of community connections or creativity, or the many other possible versions of making. These framings afforded different activities in the space, which appeared self-evident and acceptable to the users, until and unless someone started asking them questions like, “What can’t you do in this space? What would you change?” The users’ logic or what Illich terms their “sense of proportion” (p. 31) aligned with institutional decisions. Of the 63 users of the spaces (some people were both users and inhabited other roles) that participated in the study, four generated their own narratives about the spaces contrary to the institutional narratives (Rose, Sean, Fred, Wyatt). Otherwise, the users expressed contentment with the decisions that had been made, even if they did not have the power to do what they had hoped to do (Roger, Aidan, Sabian, Gladys, Jerry, Vivian).

Access – Barriers

Information and human rights philosopher Kay Mathiesen (2014) says, “A person has access to information when he/she has the freedom or opportunity to obtain, make use of, and benefit from that information (p. 607). She uses the work of Burnett et al. (2008), Oltmann (2009) and Thompson and Afzal (2011) to flesh out the factors at play in determining whether access is threatened. The three main components of access—physical, intellectual or cognitive, and sociocultural access—are all critical to the users’ ability to use public library makerspaces as convivial tools. As Illich states, convivial tools “...foster conviviality to the extent to which they can be easily used, by anybody” (p. 35). Barriers to access prevent convivial power relations in these spaces.

The institutional actors in this study all emphasized ensuring access as a primary aspect of their work and main reason for offering a creative place in the library. They stressed the physical and intellectual aspects of access, with little discussion of the sociocultural access as discussed in the **Exposure - Framing** section. (Olivia, a sociology professor and makerspace staffer in

Responsive Library, was an exception to this rule.)

Nevertheless, the library staff I interviewed were, to a person, passionate about ensuring access. Library workers labored to ensure access however they could, but often had to dodge their own institutional rules to ensure it, as the findings chapters will illustrate. Access or barriers to it, differed in variety, level, and practice. Even though staff helped as much as possible, or as much as they deemed appropriate, barriers remained. For all of the users, the spaces were an exercise in navigating such barriers to access what they needed.

Physical access.

In these three libraries, physical access to tools, spaces, supplies, and people were limited or facilitated in a variety of ways. Users, non-users, and institutional actors all identified limits on physical determinants of access related to age, race, gender, cost, time issues, policy constraints, and the spatial arrangements the libraries had made. They identified low costs, the myriad of available tools, convenient locations, and open hours, as other physical determinants supporting access.

Intellectual access.

The public library creative places are often situated in the LIS literature as a way to build skills, literacies and to support lifelong learning (e.g. Lui, 2016; Willett, 2018; Greene 2021). This learning supports patrons' cognitive or intellectual access to the tools in the spaces, and types of making, such as digital music production or digital fabrication. The intellectual access that was supported by the libraries varied. Welcoming Library and Responsive Library staff and volunteers offered regular classes and workshops. The Productive Library staff offered almost no organized instruction. Intellectual access was supported in that library by informal help and directions when staff had time and were so inclined, and free statewide access to Lynda.com, a database of educational videos that covered many design and computing technologies. The inability to help the multitude of users learn how to use each tool was a major challenge in this

library (Jenna, Colin, Chuck, Rose, Sean, Sabian, Isaiah).

Sociocultural Access.

Participants in the study identified the most problematic determinant of access as sociocultural, in that some participants could not comprehend the relevance of this service in the context of their lives, while others could. This barrier to access was so crucial to the practices of the spaces, that it warrants its own category or tension, which is explored in depth in the discussion about **Exposure – Framing**. While **Exposure – Framing** explores how the spaces were made legible to users, **Access – Barriers** explores, along with physical and intellectual factors, how that legibility expanded or reduced access.

Uplift - Fun

The goals or preferred outcomes of the public library creative places were often contradictory or contested by different stakeholder groups. What was possible in the spaces informs the tension of **Uplift – Fun**. This tension could also be labeled **Express – Learn**, the activities that were the heart of many of the goals people elaborated upon. Of all the tensions in this study, this one is the least binary, however, because self-expression and learning can and did happen in tandem, as did fun and a sense of uplift. Nevertheless, tensions about what was or was not possible or desirable in these spaces emerged from the data in all three cases. The desired ends of the use and provision of these spaces are described in the imaginaire each participant invoked, and are explored here.

In *Tools for Conviviality*, Ivan Illich (1973) describes a world in which people are alienated from their own authentic and self-motivated activities due to what he considers a “balance of learning,” that “overprograms” people’s activities to suit institutional goals.

The balance of learning is determined by the ratio of two kinds of knowledge in a society. The first is a result of the creative action of people on their environment, and the second represents the result of man's "trivialization" by his manufactured milieu. Their first kind of knowledge is derived from the primary involvement of people with each other and from their use of convivial tools; the second accrues to

them as a result of purposeful and programmed training to which they are subjected. (p. 71-72)

This concern is visible in some perceptions of the three creative places and the activities that occur in them and in the **Subject – Object** section. Users and institutional actors alike offered opinions that the spaces were supposed to be more about learning or innovating than the creating or playing that some users desired (e.g. Travis, Alan), that users had forgotten how to be creative when creativity was the preferred outcome (e.g. Hannah), or that the library co-opted the users' desires to use the tools for their own ends to suit the purposes of the library (Roger, etc.). Sometimes institutional goals to ensure that the users of the space were doing things that the institution valued conflicted with what the users themselves wished to do. At other times, user and institutional goals were in alignment, and the institution assisted users in attaining their goals.

The two main reasons for the spaces to exist, according to the participants and the documents I analyzed, were for people to uplift themselves (especially economically) through learning, and for people to have fun expressing themselves creatively and with other makers. Those reasons for the spaces differed; the institutional actors gravitated toward learning as a valid reason for the space, and the users focused upon the playful expressiveness the spaces allowed (or did not allow), as well as learning. Both expression and learning were possible at the same time, but the narratives of learning (**Uplift**) and expression (**Fun**) were often presented as oppositional. At times, Fun was instrumentalized in service of Uplift.

Subject - Object

Illich (1973) said an outcome of using convivial tools was active mastery:

An individual relates himself in action to his society through the use of tools that he actively masters, or by which he is passively acted upon. To the degree that he masters his tools, he can invest the world with meaning; to the degree he is mastered by his tools, the shape of the tool determines his own self-image. (p. 22)

In this study, the clearest tension around such active mastery revolved around issues of help and control. Library staff members wanted to help people, but also wanted to control what they were

able to do, for a variety of reasons. Users wanted the help, but not the control. Or they wanted control, but of others, revealing their lack of trust in others' good sense (e.g. Victor, Jack, Roderick). The help and control being offered by institutional actors reflected their understanding of the disparate roles of the users and workers in the spaces, and whether the libraries allowed users to be the **Subject**-acting or the **Object**-acted-upon.

The positionality of the user in these spaces deviates from those in many cooperative or private makerspaces. Instead of positioning the user as an active agent in “do-ocracies” and “meritocracies” described in such spaces (Kostakis et al., 2014; Toombs et al., 2014; Toombs, 2016), library rhetoric often positions the makerspace user as a “learner.” Sangüesa’s (2013) exploration of private makerspaces distinguishes those who are able to make decisions and those who are not: “A *subjugated participant* can expect, at most, to play the role of a learner or of a receiver, while a producer/manufacturer/designer can achieve the status of *strategic participant* and have his or her say in decision making” (p. 6, emphasis in original). Having a say in decision-making is key individual and critical agency, or “power-to.” Yet it is not structurally supported by the institutions in two of these cases, and appears to be at least in part a conviviality mask in the third case.

I am using the terms *subject* and *object* in their grammatical sense, as in: the subject acts upon the object in a sentence. The active person expresses more agency than the acted-upon. In the main, this study’s strategic participants were the institutional actors in these spaces. They are the *subjects* who create the spaces, policies and practices for the *objects*, the users. This tension was visible throughout the three library creative places. But the tension was not simple, with certain categories of stakeholders always in the driver’s seat and others excluded. Rather the identities of subject and object were continually renegotiated in different contexts of power.

Illich (1973) describes a lack of conviviality when people have “no say in how things are to be made and cannot decide what to do with them...They are degraded to the status of mere consumers” (p. 24). When the tool acts upon the user, as is assumed to be the case by the participants of this study (nearly every user described some version of this—that they creative

place existed to make them do, or be, certain things), they become the object of the system. The become “learners” (e.g. Andrea, Lisa, Pam, Erika, Laney) or they are “exposed” to things (Alan, Robin, Wendy). The users were to be “lifted up” (Jim) or have “better opportunities” (Linda, Garrett, Perry) by making technologically advanced items. They were to be “empowered” (Hannah, Fred, Janet) by the active agents: the library staff. The library was acting upon the consumers of the system.

Communal - Individual

The tension of **Communal – Individual** regards who these spaces are for, and the social relationships they allow. The tension emerges from diverse understandings of what the library is for, and the makers’ and library staff’s dispositions toward sharing and social interaction. The variable conceptions of the benefits of making for different subcommunities is also a factor. This tension often emerged from and through social relationships that develop in creating and using the spaces.

This tension involves identifying the goals achieved through what Illich labels *interdependence* involving:

Autonomous and creative intercourse among persons, and the intercourse of persons with their environment; and this in contrast with the conditioned response of persons to the demands made upon them by others, and by a man-made environment. I consider conviviality to be individual freedom realized in personal interdependence. (p. 24)

This individual freedom is realized through interdependence, in this study. Both in Illich’s theory and in the findings, the possibilities of individual goals, choices, and opportunities are made possible by the shared resources the library provides for the community, the community itself, and the relationships each individual has with the community. At times, such interdependence acts as a barrier to conviviality, as the needs of the many often outweighs the needs of the individuals, from the library’s perspective.

Comfort – Unease

This tension focuses on the spatial and emotional tensions of feeling at home in these spaces. Many of the reasons for comfort or unease have already been discussed, such as the **Exposure - Framing** and **Uplift - Fun** tensions that highlight some activities as sanctioned while others are downplayed or marginalized. **Subject – Object** and **Trust – Doubt** describe ways in which some people are acted upon, controlled, or distrusted in ways that impact their comfort. And the mechanisms of **Access – Barriers** delineates who may feel comfortable or uneasy in the space. For example, users who are considered too young for the spaces might feel uncomfortable within them (Claire, Dylan).

This tension also reveals a key part of what narratives of “empowerment” encapsulate: a change in disposition relative to one’s own capabilities. Some users described a process of becoming more comfortable with certain types of making, engaging with new tools or new techniques, or making sense of the space in a way that felt less alienating than they had assumed. The competence and familiarity some participants expressed spoke to movement from an emotional response of unease to a response of belonging and comfort.

Illich (1973) describes “pervasive frustration by means of compulsory though engineered satisfaction” (p. 62), as a threat to human equilibrium and justice. He believes that institutional control and legitimation over the “correct” types of experiences and activities causes such frustration. This is visible in this study. People using the library felt uncomfortable disrupting what they perceived as those legitimated activities by asking questions, by doing activities they felt the library would disapprove, and they downplayed the value they placed in play and fun to supplant it with more socially-acceptable narratives of economic and skill-based “empowerment.” This was not a factor for all makerspace users, however. When the library did “engineer satisfaction” through approachable projects and helpful mentors in programs, few people expressed frustration or discomfort. A notable exception is ten-year-old Claire, in the Responsive Library.

Conclusion

The following chapter will focus on the lived experiences and cultures of the three cases in this study. In Chapter Six, I will use participants' own words, the field notes, the codes and categories of the grounded theory, and the orienting theory of convivial tools to explore issues of power in each of the spaces, in the grounded theory findings for this study. Then, in the Discussion chapter, I will compare the findings and the state of the literature to see what practitioners and scholars can garner from this study, and where research needs to continue.

Comparing Case Statistics

Table 3 Community Characteristics from 2015 Census Data⁸

	Community population	Median household income	Persons in poverty	Median owner-occupied housing value	% White	% Black	% Latino	Median age ⁹	% Bachelor's degree or higher
Welcoming Library	2,000 (village)	\$58,500 (village)	11.5% (village)	\$110,000 (village)	98% (village)	0.5% (village)	2% (village)	42 (village)	20% (village)
	7,000 (town)	\$58,500 (town)	10.5% (town)	\$119,000 (town)	96.5% (town)	1% (town)	1% (town)	44.5 (town)	17.5% (town)
Productive Library	297,500 (city)	\$44,000	30.5%	\$120,000	51%	43%	3%	32.5	33%
Responsive Library	43,000 (city)	\$46,500	13.5%	\$122,000	90.5%	2.5%	6.5%	37	23.5%

Table 4 Library Data from 2015 Annual Reports Submitted to the States

	Service population	Number of registered users	Reference transactions per year	Total materials	Total circulation	Number of public internet-access computers ¹⁰
Welcoming Library	11,500	2,000	8,000	22,000	27,000	18
Productive Library	802,000	620,000	1,869,000 (all branches)	6,709,000 (all branches)	18,771,000 (all branches)	842 (all branches)
Responsive Library	73,000	29,000	33,000	204,000 (including branch)	709,000 (including branch)	55 (including branch)

⁸ All numbers in these six tables are rounded to protect the anonymity of each case. Numbers are rounded to either the nearest 500 or the nearest half a percentage point, depending on the scale of the number, unless otherwise noted U.S.Census. (2015). American FactFinder: 2011-2015 American Community Survey 5-Year Estimates.

<https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>

⁹ Rounded to the nearest half-year.

¹⁰ Not rounded.

Table 5 Budgetary Information from 2015 Annual Reports Submitted to the States

	Total outlay in 2015	Total municipal appropriation	Total county funding	Total state funding	Service Area resident per capita support (local funds/service population) ¹¹	Makerspace expenditures 2015
Welcoming Library	\$182,000	\$70,000	\$50,000 (school district)	\$18,000 (through system)	\$10.00	\$25,000
Productive Library	\$54,829,000	\$18,101,000 (property taxes and homestead taxes)	0	\$38,899,000	\$22.50 (does not count state funds)	unknown
Responsive Library	\$2,741,000	\$1,743,000	\$817,000	0	\$37.00	\$233,000

Table 6 Spatial, Staff, and Access Characteristics from 2015 Annual Reports and Internal 2016 Counts

	Overall size of library	Size of makerspace ¹²	Full-time equivalencies of staff (30 hours/week) ¹³	Number of MLIS librarians on staff ¹³	Number of staff assigned to makerspace on weekly basis ¹³	Number of hours open ¹⁴	Number of hours makerspace is open ¹⁴
Welcoming Library	5,000 sq. feet	600 sq. ft.	3	0	2	2,184	2,184
Productive Library	550,000 sq. ft. ¹⁵ (40 branch libraries also)	9,000 sq. ft.	664 (all branches)	189.5 (all branches)	11	3,484	3,484
Responsive Library	65,000 (1 branch library also)	1,930 sq. ft.	32	9	5	3182	1,560

¹¹ Rounded to the nearest \$0.50.¹² Not rounded.¹³ Rounded to the nearest 0.5.¹⁴ This information is calculated from the "hours open" that each library reports on their websites: Responsive Library, Responsive Library Idea Studio, Responsive Library Locations & Hours; Welcoming Library. This does not take into account holidays or closings due to weather.¹⁵ This information comes from IMLS (2014a) datasets.

Table 7 Program Characteristics from 2015 Annual Reports and Internal Counts

	Number of programs in 2015 ¹⁶	Attendance at programs in 2015	Number of makerspace programs in 2015	Attendance at makerspace programs in 2015	Approximate usage of makerspace in 2015 ¹⁷
Welcoming Library	1,000	7,000	42	881	unknown
Productive Library¹⁸	17,100	426,000	7 months: 225	7 months: 814	unknown
Responsive Library*	500	18,000	n/a	n/a	n/a

*Responsive Library opened its makerspace in 2016.

Table 8 Participants in the Study, Broken Down by Case

	Number of participants in this study ¹⁹	Number of librarian, staff & trustee participants	Number of user participants	Number of non-users (of the makerspace) participants	Number of minor (under age 18) participants	Number of lengthy interview (30-120 minutes, averaging 46 minutes) participants	Hours in each space
Welcoming Library	37	9	20	9	1	19	134
Productive Library	51	12	33	6	1	24	138.25
Responsive Library	27	10	15	4	6	22	131.5
Totals	115	33	63	19	8	65	403.75

¹⁶ Rounded to the nearest hundred.

¹⁷ None of the libraries kept count of the at-will library use of the makerspace.

¹⁸ Attendance data for Productive Library is partial and complicated—only 7 months of data were kept, and one of the months included both Tech center attendance AND makerspace attendance. The reported programs also include the Tech Center programs, which continued regularly in 2016. However, the Makerspace programs had slowed to a near halt by May of 2016. These figures do not include tours or tour attendance.

¹⁹ Note that the numbers in this table do not add up to the totals in this column—some participants hold multiple roles, such as trustees who are also creative place users. These numbers are not rounded. the numbers of participants listed also include community members such as funders, non-profit organization members who partner with the library, and members of other makerspaces in the communities. Total number of participants: 115.

Chapter Five: The Library Narratives

This chapter tells the stories of the three libraries in 2016, and how users and institutional actors express power in the spaces. These narratives are ethnographic explorations of the culture and practices in each space.

Welcoming Library

Welcoming Library is located in the Northeast of the United States. It nestles in a village of fewer than 2000 people, encircled by a larger town of slightly over 7,000, which sometimes lends financial support to it. The town and village of ‘Welcoming’ is located an hour from two different urban centers in New York state, not far from the Canadian border. This library has a comprehensive makerspace intended for at-will use, including a woodworking shop, 3D printer, robotics and Arduino equipment, jewelry and sewing equipment, and an array of small tools and electronics for a wide range of making. (For more details on this case, see Appendix A.) The library itself was like a living room with comfortable sofas and a coffee machine (Lisa, Hannah). The library was warm and friendly with a non-institutional look. The staff were hospitable. They knew their patrons by name, helped without being asked, and sought to build relationships and community as a central tenet of their work.

In April of 2016, I spent 134 hours over the course of four weeks in this library, and interviewed 19 community members with extensive semi-structured interviews. I spoke with and/or observed an additional 18 more informally, with consent. Some of the key participants include Hannah, the charismatic library manager and Sue, her enthusiastic assistant. Pam is the part-time Children’s Librarian. Robin is both a user of the space and a librarian working for the system where this library is a member. The users in this space include the fiber artists: Linda, who later exhibited her art at a gallery; Cassandra and Dahlia, a creative mother and daughter; Vivian, a youthful city professional; Tammy, a woman who took many of the classes offered; and Abby, a shy young woman who brought her kids to programs with her to have someone to talk to. Travis is an engineer who taught 3D printing and Arduino classes in the space, while Jerry and Reuben

attended his classes. Stanley is a non-user of the library, but is also the City Manager of the town, and is responsible for funding decisions in this space. All these participants appear white. They range in age from Stanley at about 70 to Dahlia, age eight.

In the Welcoming Library

At about 5:40 pm on Tuesday, April 12, Linda and Virginia followed Hannah, the library director, into the Welcoming Library's makerspace. Hannah flipped on the lights to the makerspace, which was unlit, even though it was supposed to be open for use whenever the library was open. I had set up for class with just the fading sunlight streaming in through the line of windows on one wall. The fluorescent lights flickered and buzzed for a moment, then steadied to a cool blue glow. Hannah bustled around the space, her heels clicking and her black skirt swishing, as she pushed tables and chairs into place.

The library sat at the edge of downtown, located in what used to be an elementary school building, along with the village clerk's office, the economic development and tourism office, the community center, a daycare, a dance studio, and a dojo. In the center of the building, the library occupied what had been adjoining classrooms in the former school, a long, snaking corridor of six rooms. Each room had its own character, with a warm and welcoming entryway painted in tones of terra cotta and chocolate, and a green and mural-filled space in the children's area. A teen section was tucked away between the adult fiction and children's areas, and was painted a dark moody brown. Industrial and vintage lights, knickknacks and accents were spread throughout the library, so it appeared like a well-decorated home. Several pets inhabited the library, increasing the feeling that the space is alive and home-like. Two guinea pigs squeaked next to the circulation desk; a chinchilla snoozed in the teen space.

Several of the participants remarked on how welcoming the library was (such as Vivian, Dale, Cassandra, Lisa, Ruth). In an earlier interview, Linda said about this library, "I walked in and I just—it felt like smelling lavender. It didn't smell like lavender, it just felt like [smiles, eyes closed, beatifically] 'oooh.'" In all areas of the library, users were able to rest and socialize in

group seating arrangements, and often the spaces were filled with people playing cards, talking, reading, or just hanging out.

We were in the makerspace for this program. The makerspace room was tucked at the end of a long library in a 600 feet² room. It was accessible through double doors marked with a gear/lightbulb graphic that acted as a logo for the creative place.

Linda and Virginia glanced around, and saw the pile of wool fibers spilling over the expanse of a couple of 3x6' tables. The fibers were in dozens of colors, some coiled neatly into balls, others in a messy pile. On a longer table, more fibers, including wool, silk and sparkly Angelina, spilled from a large clear trash bag. The two women began to stroke the fibers, to choose the colors they liked best. I heard them chatting about the colors and textures as I continued to arrange materials. These women, both in their late fifties, knew each other from the previous class that I had taught on felting the week before. They discovered they were both needle felters. They sat at the same table.

Here in the Welcoming Library, I was acting in two capacities: I was a researcher doing ethnographic participant-observation in the library's makerspace, and part of that participation involved being a maker-in-residence by leading workshops four times during the month I was visiting.²⁴ Hannah asked me to teach felting classes. As a fiber artist, I had taught such classes



Figure 3 The makerspace is at the end of the series of rooms, next to the Children's library. Often the doors to the space are shut, the lights turned off.

²⁴ In Welcoming Library, the narratives of the case center in part on my own role because there was no use of the space that was NOT mediated by a user-volunteer in the space, or one of the library staff. I am not entirely comfortable in making my role central to that narrative. Not only is the study not about me, I am aware that the contrast I describe appears to favor my style of informal teaching over another volunteer's more scholarly style. This is NOT my intention—each style had its own adherents and benefits. However, participants in this study explicitly noted the differences of their perceptions of the two classes. Thus, I use this narrative to illustrate the culture and conflicts in this case. In the other two cases, I center the narratives directly on the users of the space, with my own role less participatory and more observational.

before, at other libraries and art centers.

The class was to begin in twenty minutes. I set out the bamboo mats, rubber balls, towels, dish soap, and plastic bowls filled with water. I walked to the back of the makerspace, which was visible from the doors to the space. There overflowing bins and shelves were laden with craft supplies and library stuff. This jumble of stuff confused potential users of the space at times. When I had arrived at this library, piles of craft and electronics supplies were visible in open wire bins. These bins contributed to the sense of “storage room,” which left patrons wondering whether they were able to come in. By the end of the month of my visit, these bins would be replaced by attractive locking cabinets, but the messy storage spaces would still be visible. Even with the new tidier cabinets in place, the space looked like a storage room crossed with a classroom. It did not look like a place where the general public was encouraged to come and use without explicit permission.

How Did I Not Know This Was Here?

On this evening, during the second of the four workshops I led in this library, the room felt like a chaotic classroom. White tables on wheels were encircled by metal stools, and a large screen and whiteboard loomed at the front of the room. Piles of equipment, materials, and past projects cluttered all around the edges of the room. As Abby said, later,

It's not like someone's come and said, "Oh, let's do this." Or "You can do that"...No one invites you or you really don't know [if you can come in]. The light's usually off back here. I mean, you can walk through and you can look and in and be like, "Oh I wonder what this is for." And then I found out it's where you guys hold certain classes or whatever. But at first I wouldn't have known. I probably would have thought that it's for high school kids maybe to come here and do certain things. I didn't know it was for everybody in the community.

After the previous felting class, Linda came to speak with me. She felt overjoyed at her newfound access to fellow fiber artists, and programs and tools that she wished to use. Still, she said:

How did I not know this was here?...I still haven't quite wrapped my brain around

the whole idea that if I wanted to...I could use one of those embroidery machines and have it set up ...I like the idea that groups of people could come and use it...like people who have taken the felting class could say hey you know, Shannon's leaving but we don't want to stop [laughs]. Can we come and can we figure out, you know, a night when it's free or an afternoon it's free? And just kind of shoot the breeze and you know, "Hey what do you think of this" and "What do you think if I did—"...

I observed Hannah's unceasing hustle to show people the space, to hold meetings in the space, to build local partnerships using the space, and to publicize the activities there. This is part of what she was doing that Tuesday night. She was helping people in the library, then racing back to the makerspace to make sure everyone was fine there and to see how the project worked so she could recreate the program after I was gone. She was always talking up the space and programs in the main library, and everywhere she went. Still, many people did not yet know what was occurring there.

The lack of exposure the library suffered was politically dangerous to the library, as when town supervisor Stanley said he was left out of the loop about the makerspace. I explained the makerspace to him the day we had met:

S: It's a room in which there are shared, both digital and traditional, tools for shared use and learning about both how to do robotics or 3D printing, but also woodworking and gardening and all kinds of crafts. So people come into the room to gather and share their knowledge by actually doing hands on physical creation in the space in the library. Have you heard about that at all?

No. But I would be in favor of something like that...This country is starved for trades...There's only so many jobs open there for—I'm going to say college degrees, which is extremely important... but how about getting the guys that can do plumbing, heating, mechanical, build houses. It's not all just engineering. It's not all school teachers. It's not all doctors. There are kids out there that are very brilliant, but they're not college material. So I think that's a great program. If they can offer something like that for a local library—[raises eyebrows as if impressed]

S: Yeah. They've gotten grants and so forth and have put in—I don't know, many thousands of dollars worth of material.

Have you been to our library up here?... I don't know if they've done that or not.

S: Two years ago.

Did they really? See, I didn't know that. I don't get a report. So I will talk to her...

Stanley was perceived by the library staff as opposed to the makerspace, when in fact, he did not even know it existed. The library did send reports to his office, with photos and clear explanations about the space. He apparently had not read them.

Both the library staff and Stanley expressed some inconsistencies in their understanding of a need or legal basis for town tax support of the library. The library believed that since they served the town of "Welcoming," they should receive tax revenue funding from that community. But before learning of the makerspace, Stanley was not even convinced of the necessity of the library:

But today, to me it would be hard to justify a library in every community. They're not cheap. You're going to buy the books. You're going to have the stuff on the shelves. You've got to have staff. This operates up here on a number of volunteers, but they have a paid— the head librarian and she does a phenomenal job... I don't discredit any of these people, but how many services can the tax payers support?

The library wanted to benefit from that tax support, but were not always able to reach the people that needed to know about it most. And because they had not made their case about the makerspace, important funders were in doubt about the efficacy or necessity of their work. The town offered the library little funding, even though many users lived and paid taxes to the town, not the village in which the library was chartered.

Some of the patrons were confused about whether they could access the space due to a lack of clear exposure to the space, its rules, or what it was for. Programs were limited. Only a dozen or so people were allowed to sign up for many of them, and as Hannah noted, often these sign up sheets filled up within an hour of their posting—with users active in the library or the library's Facebook page getting all the slots. Nearly every maker program had a significant waitlist of people interested in attending. As Linda noted,

How do we know the availability of the room?...I didn't see anything in writing that said ok the studio, the steam lab, is open for any activity from 1 o'clock to 3 o'clock or from 4 to 6 unless there's a class...I guess that I was surprised that there was nothing that I saw, online or in the pamphlets, that kinda gave you a little more of an idea of, of—it's a wonderful spot, but when is it open?

Meanwhile, the staff sometimes struggled. Children's librarian Pam noted that she had no time to try the tools out during her working hours, and no training was made available to her, so she felt intimidated and alienated from the space:

Probably the biggest thing that scares me is that I don't know how to use most of the things here...in order for me to remember how to do something, I have to do it on a regular basis... So if you teach me 3D now, 3D printing now, and I don't use it for six months, I'll be starting from square one again....

And like I said, not knowing how to use a lot of things, somebody will come up to me now and say, "Oh, how does this 3D printer work?" I'm like, "Go talk to Sue or Hannah."

Pam described learning how to use some of the equipment on her own at one of the library's classes, but that other classes had limited openings. She felt she should not take up space that a community member might benefit from.



Figure 4 Linda and Virginia wrap their ball with wool.

In the felting class, fifteen people were signed up to make felted wool bowls that evening. They would spend three hours wrapping rubber balls, the kind used in gym class for dodgeball, with wool roving (strips of unspun wool ready for spinning or felting). They would bounce and rub the roving to felt the wool. They would then puncture the ball and cut the felted hollow sphere into two bowls, one for each participant to take home.

I moved among the tables, placing a ball on each one as the other participants trickled in. There was Vivian, about fifteen minutes early. She was a young auburn-haired white woman, a professional who worked in the city 40 minutes away. She was wearing a silky cream blouse, tasteful gold jewelry, black cigarette pants and low-heeled pumps. She was dropping off a bamboo mat we had used in our first class, which the library director Hannah has allowed her to

take home to finish her project. She trusted that Vivian would bring the materials back. Vivian could not stay to participate in this class. She had work commitments that evening and could not stay. She looked at the piles of fiber and rubber balls with a mingled expression of what I interpreted as curiosity and disappointment. She seemed to want to stay rather than go and work, and volunteered that she was looking forward to doing an interview with me soon. All the felting workshop participants had indicated that they would like to be interviewed for this research.

Tammy, Eva, Gina, and Margaret came in, individually. They ranged in age from their late 40s to early 60s, all white women in jeans and sweatshirts or casual sweaters. Renee came in, chatting with Hannah. She was about 50, also white. I learned later that she was on the library's board of trustees. The women milled around, spoke to Hannah, interacted with me a bit, but left me to my set up. They did not immediately sit together as Linda and Virginia had. They went through the fibers, exclaiming about the softness of one, the electric orange of another.

Cassandra and Dahlia came in. Cassandra was in her early thirties, a blond white woman in a pink sweatshirt and a wide smile. Her eight-year-old daughter Dahlia bounced around the room, chattering to her mother, to me, to Hannah. She grabbed the pink wool.

Abby and her eleven-year-old son wandered in silently. He looked around with muted interest as he and Abby sat at the edge of the room alone. She fiddled with her bracelet. She was a small dark-haired white woman in her late twenties or early thirties, wearing a long dress and a denim jacket, several bracelets, with her hair tied up in a messy bun. He was slim and quiet. He cut in and out of the class, retreating to the children's library from time to time. Abby gave me a shy smile when she selected her wool, which I had to invite her to choose. I gestured to the pile of wool and told people to select a couple of colors to begin, but every other participant had already done so.

The class began in fits and starts, with people clamoring for their favorite colors of wool, gathering piles of it to set in front of them as they sit at the white tables facing the front of the room, where I stood. I explained that the process of felting around a ball was much more challenging than the flat project we had made in our first class, and that we would be working

together. Some of the makers, including Dahlia, wanted to talk about what they did with their first piece of felt. I delayed the instructions for the current project so they could do a show and tell. Dahlia had made her project into a small bag, which she did not bring, but she described making it in a manner that seemed advanced for an eight-year-old. Linda had used her felted piece as a background for a needle-felted bird and water scene. It was well-designed, elaborate and beautiful. She had done needle-felting before.

Abby did not speak up, but in a later interview talked about making felt with her kids, They liked what they made, they thought it was cool. They told their grandma, "Me and my mama—" And the first one that we did, the placemat, my Aunt C lives up in S_Town and I mailed it to her and she's like, "Oh, that's really nice and beautiful." Like yeah, it's some felting technique. And she has a plant sitting on it.

At another point, Abby spoke to her trust of the librarians and other library users, as well as her ability to trust her own abilities, when she said, "I'm so scared of everything, I probably would never think to ask somebody, 'Can you guys show me how to drill a hole.' I'm just a nervous person."

In interviews for this case, it became clear that most people trusted that between their own innate abilities and the assistance of library staff they would be able to create whatever they wanted to (Linda, Jerry). But one other user, Reuben, wondered if he were capable of learning how to 3D print.

The decisions about what the space was intended for were left up to the library staff, but the staff also wanted to honor the wishes of the community as well as their own interests. As Sue had said,

It was like, "Ooh, can we do this? Ooh, I don't know if fire codes will let us do that." I mean, at one time we had—We wanted to get a laser cutter. At one time we wanted to have a kiln. We found out that the village doesn't allow anything with fire and heat. We'd have to have—We couldn't really do it here. A small kiln we could probably get away with, but it would be testing the limits of the village. We'd probably have to have some sort of special—We couldn't install it without getting approval from them.

S: But not a laser cutter, huh?

No, because that actually does produce flame, so—And that's one of the things—Even when somebody asked us about wood burning, it was one of those, “Ooh, we're gonna have to check.” Because a lot of our ideas came from patrons then who, when we started asking them about it and talking to them about it to see what the community sense was, they would start asking, “Ooh, could we do this?” So some things we had to say, “We don't know.” [laughs] And then some of it was, “Hmm, well I don't know how to do that. But maybe we can find somebody who does.

The library reflected user interests, seeking teachers to lead desired workshops, and buying equipment that people requested. They trusted that users would share interests in similar tools and programs.

Innovation, Not Repair.

Nevertheless, the staff had some clear ideas as to what the space was for, and what it was not for. Hannah had said it was for “innovation, not repair.” And an interchange after one of the fiber art classes highlighted the way in which institutional perspectives impacted how the library served some types of making over others:

A long-haired woman from my felting workshop [Margaret] arrived with her daughter's spinning wheel in hand. She was loaning it to the space for a little while, so people could try it and experience spinning. We had spoken of this during my first class. Her daughter was the junior wool ambassador for the US this year—a teen who had won this prize for her knitted garments in the “make it with wool” national competition. I spin myself, so was able to teach others how to use the wheel and ensure its safety, which she was delighted to know. She trusted me, which felt like a great gift. It was an Ashford Kiwi wheel—dual treadles and direct drive. Easy to learn on.

As she dropped it off and left, a young woman with blue hair entered the makerspace. I had met her before but couldn't remember her name or the context in which we'd met. But I immediately showed her how to spin and she took to it instantly. She said she thought the space should include a wheel. I asked whether she thought that meant they'd get one, if she asked. And she was entirely confident that the library would buy one. I was surprised to hear this level of confidence and heartened by it—it seemed obvious at the time that the library must have felt like a trustworthy helper to at least some patrons. But later I remembered that this was Sue's [assistant library manager] daughter. Perhaps this

was why she was confident. She knew her mom was one of the two prime factors in steering the space's development. Hannah came in, and the woman asked if the library would buy a spinning wheel. Hannah obfuscated a bit, saying that if it seemed like a useful tool they would purchase it—signaling a willingness to consider it without actually committing to it. (fieldnotes 4/14)

A few days later:

I asked [Hannah] about the spinning wheel idea again. I wanted to see what she would say without a patron present. She repeated what she said—that they'd buy one if it seemed there was interest. I said that interest had already been expressed, within 5 minutes of one entering the building. She didn't seem entirely convinced, shrugging, face noncommittal. I mentioned that there were wheels made of PVC that were less expensive but sturdy, or that a good inexpensive wheel was a Lendrum. She looked it up—one costs 560 dollars. The PVC Babe wheel was over 300. She didn't say no outright, but I could tell there was little chance that a spinning wheel would be made available...

Interestingly, Jerry stopped in at about 4 and started talking to Hannah about a GlowForge laser cutter, which cost a couple of thousand dollars. I sidled over to listen and Hannah was super enthusiastic about it, saying she would look at the budget and probably get one. Afterward, I asked her why she'd consider purchasing the laser cutter but not the spinning wheel and she said, "It's going to help someone get a job. We really want to help people acquire those 21st century skills."

(fieldnotes 4/19)

This exchange illustrates some of the tensions between the uplift imaginaire of the public library makerspaces and one that focused on having fun. It further illustrated tensions between the craft-based making the women in this case desired, versus a more male-oriented technological focus.

I Want To Make EVERYTHING.

In the felting class, after show and tell, I did a brief demonstration of how to wrap the roving around the ball, breaking it into thin wispy pieces. More than two hands were needed for this project. One participant needed to hold the wool in place as the other person layered on more. Sometimes they wrapped yarn around the ball, or placed bits of sparkly fibers. Hannah joined us sporadically. She had stayed for the entire first project, the week before, but in this class

she was working on some library task that kept drawing her attention away from the makerspace. She brought me a few more rubber balls she'd found, and the participants sorted themselves into teams of two—except for Eva, who was working alone. Eva gathered a large pile of diverse fibers in front of her ball. She ignored the rest of the chattering makers and concentrated on her colors, her textures.



Figure 5 Cassandra and Dahlia roll their ball.

I was worried, a bit. We had planned to take the balls outside to bounce them, because we had to get the wool wet and soapy so it would felt. I was concerned that we would make a slippery mess of the floor. But an April downpour derailed those plans, and we had to work as carefully as possible in a room full of furniture on wheels, expensive woodworking and delicate electronic equipment. As the makers wrapped the balls, they asked me dozens of questions: How thick should the fiber be? What would happen if there was a lot of silk in the roving? Could they just use the yarn? Could they avoid popping the ball to save it for future use? I trusted the users to be careful, but I had a little doubt. I figured Dahlia and Abby's son would be fine, because kids are easy to keep under wraps with this many adults around. The adults I was more concerned about—I did not want to try to control them, only to help them.

I answered the questions casually. I circulated through the room rather than standing in front lecturing. I got my hands wet and helped to smooth down fibers. I helped wrap a ball in netting, to demonstrate the final step in the wrapping process, and secured it with rubber bands:

In the end, the class was essentially self-taught by the participants. I just roamed around and assisted or talked a little about why one had to tease out the ends of the yarn, or how to avoid thin spots, or the difference between felting and fulling wool. Sometimes I used my hands to show how to do something. A couple of times I called people over to see what one participant was doing—like when Margaret and Gina made their ball an ombre from blue to red, and when Linda and Virginia swirled on some silk paper with wisps of merino on top to hold it in place. I talked about how that was similar to what we would be doing with our final projects, the nuno scarves. Essentially I was not the teacher in the class, which is exactly how I like it. I was more an adviser. I felt comfortable like this, and it seems like the others did as well—except maybe Eva. She might have wanted more structure and explicit teaching, I don't know. (fieldnotes 4/12)

Each participant was able to decide for themselves what they wanted to do, how they wanted to do it, although those choices had to be negotiated with their partners. They were the subject of their own sentences, and I and the library workers were just the object, as in: “Margaret and Gina decided to make ombre bowls, and showed them to Hannah.”

When it came time to bounce and roll the balls, my worries evaporated. Each team wrapped their ball inside a couple of plastic grocery bags to contain the soapy water. Little got on the floor, and they swiftly wiped up those spills. As they worked together, the people who had not really known each previously other chattered together, and the noise in the room rose to deafening levels. Laughter and surprised or disappointed hoots would erupt when something went well, or not as anticipated.

Cassandra and Dahlia sat on the floor, rolling the ball back and forth. Margaret and Tammy bounced their ball atop a towel on the table. Eva kept piling more and more colors onto her ball, working slowly. She never got to the point of rolling her ball, because her precise placement of the wool was time consuming. She was silent, not ebullient as the other participants. Abby and her son tried to stay out of the way and barely spoke to anyone else, until



Figure 6 Linda and Virginia's bowls

people began to circulate to admire one another's work. I saw him leave the space and go into the children's library, but Abby wore a small smile and said a few words.

The room became a hubbub of ideas and compliments. Everyone liked the others' colors. I saw Linda point out a thin spot in Margaret and Tammy's wool. She told them it might rip there if there was not enough wool. At one point Dahlia announced to everyone that she was an idea person. She was just filled with all kinds of ideas of things to make and do. Her mother laughed proudly and agreed. Everyone smiled at the little girl. She was holding her own with these projects, doing them just as well as people six times her age. The participants talked about the various things they made, from food to fiber arts to woodworking projects. Dahlia said, "I want to make EVERYTHING!"

At the end of the workshop, we had mostly finished our projects. Linda and Virginia had popped their ball, cut a small hole in the sphere of wet wool, and turned it inside out. They cut their ball in half, and each had a multicolored bowl to take home.

They Found "Their Tribe."

When the women left the felting workshop, they were chatting and laughing as they filed out of the door into the darkened closed library. I saw Abby's son get up from sitting in a circle of light by a lamp and walk out with her. The women were showing their treasures to Hannah. She was excited as they were, looking at the beautiful felt they had made. A community of artists was emerging:

After class everyone was so loud and chattery! We walked out into the darkened library and everyone showed Hannah their bowls (except Eva, hers was wrapped on the ball and in plastic). They were all so eager to share, and laughing, smiling. Everyone seemed to have a little spring in their step. And Hannah seemed so pleased. She was grinning her incredibly infectious smile. When Dahlia said she loved loved loved making felt, I could see Hannah sort of expand with joy and pleasure. She beamed. So did Dahlia. So did Cassandra. Actually, every person there, except Abby's son and Eva, was bubbly and loud, and happy. Eva just bustled off. Abby's son was like a wild animal about to spook at any moment, sidling at the very periphery of the crowd, nearest his mother.

For Hannah it felt like vindication of what she has been trying to do (she said so as we walked to our cars after cleaning up—that all she ever wanted was for people to create and find the joy in creating). She’s not the type of person to tear up over such things, but I am, so I was glad it was dark and windy, so my wet eyes were not visible. I was very happy for her. She has worked hard trying to get this makerspace going, to being a real community of makers. (fieldnotes 4/12)

There were few other opportunities for such community development or such classes in this small village. The recreational center, where the library was located, held classes but they were generally fitness classes. Members of the community could travel to the city, 45 minutes away, and find classes and arts experiences. But this community was so small that the library was the only place where people could find other locals interested in similar projects or making disciplines. In some small communities, such as this one, the library becomes a *de facto* recreational, social, and cultural center of the community.

Later in my time in this library, Dahlia and Cassandra came to visit me and make with me. They brought dinner, some Chinese food they had picked up in town.

We sat down and ate and chatted. Then we worked through a bunny needle felting pattern and I showed them how to do what was needed. The bunny turned out pretty well. But more importantly, I got to spend great time with them. We just made together. I didn’t record or take notes of our chat, but I recall Cassandra saying that the makerspace was fantastic for her high energy/high creativity daughter, and how nothing else like this was available to her. Dahlia...is eight years old, and technically too young for this study ... But according to Cassandra, she LOVES the space and the classes, and the process of making. She was excited about all of this. She wanted to learn all of the tools and crafts, and was making great headway. She already was an accomplished felter, but also a beader and was learning to sew. ... they hadn’t really talked to Hannah before the felting class. Now they were talking to her a lot, and giving her the feedback she said she treasured.

Dahlia and Cassandra were building a community with me, with Hannah, with the other makers they met in the makerspace. The loved this. Cassandra described how happy and accepted her daughter felt, and that she had worried that Dahlia’s high energy would be in conflict with the adult needs in the space. Instead, they felt like they had found “their tribe” (fieldnotes 4/25).

I Never Would Have Thought I Would Have the Opportunity.

The scene of the felting workshop differed from another workshop I observed in the space. The hands-on felting class brimmed with color, noise, movement, interaction, and active creation. The 3D printing class was more traditional, quiet, and teacher-centered. No one used the tools to create anything, except the teacher, Travis.

Travis was a 50-ish year old white man, who wore chinos and a button-down plaid shirt, tucked in, with a belt and loafers. He was an electrical engineer. His demeanor was friendly, knowledgeable, and approachable. On Thursday, April 14, he stood in front of a room of mostly silent people and displayed a PowerPoint embedded with videos of 3D printers making elaborate things. The room was darkened to allow for the PowerPoint. I noticed that two of the participants from the previous week were not present, one middle-aged man and a teen boy. Everyone else sat in their chairs, the occasional squeak of someone rolling their stool across the laminate their only sounds as Travis fussed with the printer, trying to get it to print correctly.

Travis taught about printer settings that week. He spoke at a very detailed level, describing all the axis settings, layers, supports, rafts, etc. He changed the settings on the printer's interface, which was beamed onto the wall, but was hard to read, due to its small text.

In looking at the 3d modelling software 123design, Travis talked about the mesh – “the tessellation of little parts put together is the mesh.” He described the size of the model file in terms of how fine the mesh was. It was “pretty uncommon to see all of the flats holding up on this coarse-meshed cookie-cutter” in other words the heart-shape was not perfectly smooth along the curves, but was polygonal...

He explained that you cannot change from an .stl file to a mesh file, though another modelling program, Blendr, will do it. But Blendr is a hard program to use. He talked about the premium version of the Autodesk modelling software modules but said that most people don't need it.

Then he went to Thingiverse to demonstrate that digital library. “I believe that everything is free... But be careful, people put stuff up that is theoretical.” For example, his daughter was an A10 pilot. He wanted to print a model of that aircraft and downloaded one but it was garbage. Then he showed a video of a dragon door knocker print, which was a very elaborate and fine-tuned model. Jerry remarked “it would take quite a while with all that detail.” This was a very

long and repetitive video. ...

I noticed some people squirming in their seats, or craning their necks to see the small print on the screen. Tammy in particular seemed unable to find a comfortable spot on her tall stool—she is rather short. I could tell she was uncomfortable and I also felt that way when I sat on those metal stools a long time. She and I made eye contact at one point and she shrugged ruefully and repositioned her legs. (fieldnotes 4/21)

Tammy looked like she was uneasy, and the space was not particularly comfortable that night. It was cold, dark, and quiet except for Travis's voice and the soft robot drone of the 3D printer, demonstrating one of Travis's prints.

Two of the men asked questions several times, about why certain settings were needed. Travis talked about the many failures he had with the prints, reiterating "3D printing is not always efficient or easy." At the end of the class, Travis gave homework for the next week's meeting: "Go to Thingiverse," the online digital library of models to print, which he had demonstrated earlier. One participant asked what they were supposed to be looking for. "Go have fun," Travis encouraged them. Travis asked if the 3D printer workshops had answered everyone's questions. Tim said, "You've answered my question—From the first time I came I wanted to know what would the average Joe do with thisYou answered my question" (fieldnotes 4/21). He seemed comfortable with this more academic, less hands-on style of class.

After the program, Time and Jerry stayed after class and asked Travis more questions about different types of 3D printers and filaments. They were comfortable with the jargon of 3D printing—happy and engaged. Travis seemed pleased and spoke excitedly of the potential for making things using this technology. This conversation went on for about fifteen minutes, and it was clear that Jerry in particular was thrilled to find someone whose brain he could pick about 3D printing.

The other members of the class filed out quietly. I later interviewed Reuben, who had taken the first class in this 3D printing series:

Reuben was in his mid to late 40s, white, shaggy brown hair and a beard, with glasses. He was wearing a Harley t-shirt, a windbreaker, jeans and workboots. He

worked at a manufacturing company a few towns over...

He had been disappointed in the 3D printing class, said it was boring and too long. He still wanted to use the printer, but had to figure out a time to learn it. I asked him what the makerspace was for, and he said prototyping and repairing broken things. He said he'd use it to make tools or gadgets for hunting. When I asked him what libraries were for, he said, "Learning"...

One of the things that stuck out from this interchange was Ruben's obvious dismay at thinking that 3D printing was going to be a breeze, since he had a lot of technical expertise with machines, but after the class he felt entirely overwhelmed and demoralized. (fieldnotes, 4/27)

Reuben had hoped to use the printer in the class. He was critical of the library's way of teaching, even though he liked the teacher Travis. He was disappointed by the academic tone of the class, saying it felt like "going to college." At the same time, he was impressed by the library's offering of tools. He just wanted a different type of learning experience to engage with it. He was unsure if he would return to use the equipment.

Others had a more positive experience. Jerry was a 40-something white man who was enthusiastic and interested in the information he had learned. He was an avid maker, who had done a lot of work with 3D modeling and electronics in the past:

[Hannah] took me in there and I was like wow, because there's like so many activities in one little room....

You have a woodworking lab in a library?! What??? And a lathe?! That all blows my mind.

I don't know if it's getting enough publicity for it... I saw the little thing, the card in the library and it said STEAM on it. And it says all this stuff. And it's just—[sighs and shakes his head]—I don't know, maybe if there was some kind of advertisement ...

I never would have thought I would have the opportunity to see a 3D printer...I would have had to drive quite a ways to go anywhere that would have something like that, I would think.

Jerry was exposed to the idea of the library having a makerspace through interacting with Hannah. Having been exposed to the ideas of 3D printer access, Jerry wanted to make stuff. He wanted to take the library's Arduino class and to pursue that type of making on his own time,

just as Hannah hoped people would do. He was not put off by the advanced informational tone of the 3D printing classes. He was looking for indoor activities to do over the long winters. He was willing to drive from twenty minutes away to use the space, though he worked in the evenings and could rarely attend library workshops.

We Really Talked and Connected.

Jerry was the person that Hannah had in mind when she created the space—a person who came individually, at-will, without needing a class, and worked on leveling up his knowledge and skills on his own time. He was a comfortable fit with the makerspace that Travis saw as well—a makerspace where advanced technological learning opportunities and high-level abstraction were welcome. Jerry had found *his* tribe and his type of learning and engagement within the makerspace. It was a high-level, individual endeavor for Jerry.

Meanwhile, Linda, Cassandra, Dahlia, Vivian, and the other felting class participants wanted to create their own social practices of making together. Whether the making was communal or individual depended on the person, but they all wanted the access to do it on their own terms, not simply in library programs at proscribed times with proscribed projects, which acted as barriers to their goals.

One participant, Tammy, attended both series of workshops. When she considered the felting and earlier woodworking programs she said:

In the woodworking class and the felting class—maybe because it was all women—we really talked and connected with each other. I learned a lot and I have skills now that I never had before. I loved being able to use the saws and stuff, because I never have before. In the 3d printing class I felt more like information was being poured into my head. There was so much! I still have no idea how to use the 3d printer, or maybe even what I would make on it. but he told us so much. I was drowning in that class [laughs] but it was interesting. I actually had a hard time staying awake even though I was interested. Maybe because it was after dinner. And we weren't moving around like in your thing. I loved being able to laugh and move and make stuff in the craft classes.

S: Did you make friends in any of the classes?

I did—I met some in the woodworking class who were in the felting ones too. There was—I don’t remember names actually but there was the older woman who did a lot a felting already? The one who did the birds? She was in the woodworking class too. And the other one...

S: What about in the 3D printing class? Did you connect with anyone there?

Oh not really there, because we never really did anything. We didn’t talk to each other. Didn’t make anything together. Like when we made those bowls with the balls I remember her name was Margaret and she was very nice. But I know that the guy who taught that class—he seemed nice. I think I would ask him for help if he was in the space and I needed to print something.

S: Have you ever seen him in there outside of class?

I’ve only been there for classes, so—like he was nice, but not like you or Hannah or the guy who taught the birdhouses. You’re more like friends....You can tell you care about people and want to help—I guess he does too. But like you and Hannah and that other guy were more casual and just talked like friends. You just let us do our thing—I mean, that guy WAS nice!...He knew so much! I was in awe.

S: Did the other people leading workshops not know as much? I mean, you don’t have to talk about me [laughs]

No you did! [laughs] It was different though. That was like a college class. Yours was more like hanging out with someone who has done stuff a lot.

Welcoming Library Conclusion

While this library had yet to build the sort of at-will making practices and community of makers, as many of the makers and library staff dreamed, it was clear that such informal making would be occurring soon, whether it was social and craft-based, or individual and technology-based. The makers wanted to make. Since the data collection, some changes have occurred in this library, with the “clean” technologies placed in the central part of the library, including the 3D printer and electronics equipment. The “dirty materials” remain in the makerspace, including the woodworking materials. It is unknown whether users have shifted toward more at-will independent making.

Productive Library

The Productive Library is the main branch of a large library system, sprawling in the center of

a vibrant, diverse downtown area. The city of “Productive” has 297,500 residents, and has a much larger urban area encompassing dozens of suburbs. This community is much more diverse than either of the other two cases, with a 51% white population, 43% African-American population, and 3% Latinx



Figure 7 The Productive Library

population (U.S. Census, 2015). Nearly a third of all the city residents live in poverty. Homelessness and drug addiction are widespread (Hernandez, et al., 2020; U.S. Department of Health & Human Services, 2020, July 8; U.S. Interagency Council on Homelessness, 2020; Strategies to End Homelessness, 2019).

The city is situated at a crossroads between two major American geographic and historic cultures, with some locals considering the town more Southern in culture, and others considering it more Midwestern. To my northerner’s ear, the accents of the hover between a southern drawl and crisper Middle America tones.

The library is large and bustling. The makerspace was, in 2016, the largest in any American Public Library, with over 9000 square feet of space. It is situated near the Teen library, across a broad hall from a computer center packed with a hundred-plus people availing themselves of the library’s computers and internet access.

I spent the month of May, 2016, in this library. Over the course of more than 138 hours, I interviewed and observed 53 people. Twenty-four of those interviews were lengthy semi-structured interviews, with the rest being more informal. Even though many people participated, the library director and board of trustees did not meet with me, despite repeated requests. Nevertheless, I spoke with two other upper level administrators, two librarians, and eight paraprofessional staff members, 33 users of the space, and six non-users. The key staff participants in this study are: Jenna, the team leader in charge of the daily operations of the

makerspace; Chuck, her boss, the technology director who oversaw both the makerspace staff and the technology center; Colin, Jenna's second in command, who replaced her several months after this study ended; Nick, a staffer in the space earning his Masters in Library Science degree; and Janet, a high level administrator of the library. All the library personnel participants were white. For the users of the space, the diversity was more reflective of the community. Rose is a Black woman in her late 60s or early 70s, and is a regular in the space. Sean is also a regular makerspace user, white, in his 20s and had belonged to a private makerspace. Victor (white, 30s) and Sabian (Black, 30s) were two power users of the space, but who used the space in very different ways, while Perry (Black, 40s musician) and Heather (white, 40s teacher) were new to the space. Anthony (Black, 50s), Luisa (Latina, 20s), and Aaliyah (Black, 20s) were non-users of the space.

In the Productive Library

Rose, a compact African American woman with greying short hair, was standing at the cutting table in the Productive Library makerspace, cutting out aphorisms from a large sheet of iron-on paper. She had printed these on the vinyl printer. She wore a brimless cap, adorned with pin-on buttons, one saying, "Don't Litter."

I had seen her in the space repeatedly in the time I had been here. She always seemed comfortable in the space, like a regular. Rose had seen my study poster saying, "This is a research site" that was pinned to a bulletin board, and asked the staffer Nick to introduce us, because she had some things she wanted to talk about.

Once Nick introduced us to one another, she launched into a monologue regarding her concerns about the space: that it was not being used enough, that people cannot afford it, that it was unclear to some what the space was all about. As she spoke, she



Figure 8 Rose cuts out aphorisms printed on iron-on paper.

continued cutting her iron-on aphorisms into neat rectangles using the rulers, cutting mat, and X-acto knife supplied by the library.

Rose described a different vision of the space from most participants I had met thus far at Productive Library. They had described a space in which anyone could make anything, a space filled with exciting potential. The space Rose described was little-used, exclusionary, confusing, yet still offered her a great deal of opportunity to work on projects important to her. These were community-based projects, ones in which she created gifts to give to people she met—not only good friends, but new-found acquaintances. She ironed the inspirational aphorisms she downloaded from the internet onto cloth, which she then sewed into small pillows. One said “Being positive won’t guarantee you’ll succeed. But being negative will guarantee you won’t.”

Rose embraced this attitude. “Persevering is my most favorite thing I do,” she said, when she spoke of her own confusion or ignorance in the face of few wayfinding signs or directives, occasionally unhelpful staff, and a lack of knowledge about the possibilities of the space. She contrasted this with those who inhabited the library’s large computer lab, which was packed with people that the staff identified as often low-income or without homes.

The scene in the computer lab was quite different from the one in the makerspace, although the two spaces were adjoined by a periodical reading area, “the bridge” or hallway that connected two parts of the library. Rose pondered why so few people crossed the bridge from the computer lab to the makerspace to use the tools, especially since, she said “they all sit over there sleeping or chatting or being on their phones or whatever.” In her description, I got the sense that she identified the activities that occur in the computer lab were time-wasting, or not as valuable to her as the activities that the makerspace afforded.

She decided that lack of awareness was the problem, alongside people’s unwillingness to ask questions, or staff members to answer them:

... They don't understand anything and they don't know how to just come and ask... And asking one question seems to be acceptable with the [library] associates, but if you ask this question and that question, this question and that question, about the equipment or about the computer or whatever, then people start... You

could easily start to feel intimidated... ‘I don't know what this place is for’...

I Don't Know if I'm Allowed to Be in There.

Rose's concerns were not new to me. A week prior, I spoke with Anthony, an older Black man who was without a fixed residence. He used the library to stay out of cold or rainy weather, to amuse himself with the computer and YouTube, and to visit with friends. He was sitting in the Technology Center, a vast room with over a hundred computers—all occupied. I wanted to speak to people in this room, but everyone was focused on their screen, and I was intimidated by the groups of laughing friends around the tables and scattered at the edges of the space. Then I saw Anthony, sitting alone at a table. He smiled at me when I smiled and nodded at him, so I asked him if he would speak with me. He wondered why I even wanted to talk to him. Although he was in the library nearly every day, he had never used the makerspace and did not even know what it was. I asked him what he knew about the Makerspace:

Well I actually don't know what you mean. I think you mean that space over there across the bridge...I don't know anything about that place. What's going on over there?

S: That's what I'm asking you. [laugh] No ideas, huh?

Well I seen people in there but I don't know if I'm allowed to be in there or not and I don't know what that is all for that stuff in there...I'd seen some sort of machines doing something but I don't understand what it was. There are computers over there.

Anthony went on to describe his confusion about what the space was, who was allowed to use it, and why it existed.

Early in my fieldwork, I attended the first major outreach event the Productive Library staff did, outside the library, at a brewery in a gentrifying “artsy” (Jenna) neighborhood abutting the downtown area. This neighborhood has, according to some locals (Ray, Nick, Jeremy), pushed an African-American, economically disadvantaged community out of the center of the city to make way for wealthier “hipster” residents (Jenna, Ray), abetted by a new high-cost trolley system that connected the neighborhood to downtown. The brewery at which Productive Library

hosted a program provided ping pong and social space for a young, middle-class-appearing crowd of singles, couples, and families. In a community that is 43% Black, the crowd at this event appeared overwhelmingly “white.” The library staff that were present, who were mostly males in their twenties, were all white. Many of the staff members were also involved with the arts as comedians, musicians, writers, and artists. They blended seamlessly into the brewery crowd.

The library ran out of their 50 laser etched pint glasses within moments of the event’s start and people in their twenties and thirties clamored for a glass. During the program, happy children crafted painted circuit cards, young couples made buttons and bottle openers, and large crowds admired the Eggbot and 3D printer as they churned out small toys for participants to keep. Over two hundred people participated in the activities (Jenna). The outreach program had exposed the well-off young people of this neighborhood of the possibilities of the library’s creative place.

But there was another community of intensive library users who were not similarly exposed—those like Anthony, who already used the library every day for a place to stay and free computers. This community did not enjoy a real framing of the possibilities of the space for their own use. Like many users, Anthony was curious about the space, but did not wish to ask questions of the library staff:

Well, they make you feel kind of stupid. Like if I ask how to go to something on the computer [the library worker] looks like at me like I don't know anything.

S: Is that true for all of the library staff or just some of them?



Figure 9 The MakeyMakey, Google Cardboard, Little Bits, and Cubeits in this case are not labeled or explained. Only those who already are familiar with such items are likely to understand what these items are. This was the case whether they were new to this sort of making (Beth, Melissa) or experienced (Rob, Brent). Similarly, the laser etched skateboard deck, laser cut acrylic chessboard and 3D printed toys were not immediately comprehensible as potential projects by some users (e.g. Beth, Melissa).

Just some of them.

S: So you like asking ... some of the other nice ones for help?

Well I don't like it. But I could do it and they won't be treat me like I'm stupid...

No, I don't want to ask anybody for anything.

Anthony and Rose did not trust all of the library staff, nor did they feel comfortable around most of them. Rose made her own path into the space, but Anthony felt like an interloper, and that the library did not exist for people like him:

The library is really for other kinds of people...I don't think they want us here and we are in their way sometimes I think some of these Library people are maybe a little racist and they don't like Black folk. Or they scared of us. They think we shouldn't be here all time. Some of these guys I don't think they know what to do with us they just kind of pretend we ain't here. I know I seen some white people come into use these computers and the Librarians treat them real nice. So I think this place is...I don't know, I just think maybe they tolerate us sometimes.

This lack of trust bubbled to the surface in this library.

Users in the space were not sure when to ask questions, and what was too much to ask. They were in the position of needing to ask, and feeling like they should not. People such as Rose and Anthony doubted the staff would be helpful, or felt the staff did not trust in the users' abilities to be safe and effective in the space. Moreover, they (and others in this library, such as Luisa, Aaliyah, and Marla) did not always trust the motives or capacity of the library staff to value or take care of their needs.

One example of this perceived lack of value involved Ariel, a Black woman of Bahamian descent, about age 25. One day I observed Ariel enter the space, carrying a heavy bag packed with books. She wandered around gazing at the various tools and activities for about three minutes, then turned to leave without interacting with anyone. When I spoke to her, she said, "I have no idea what this [waves hand] is about. Can I use this stuff?...That printer over there looks interesting [pointing to the vinyl printer] but I'm not sure what I would make with it" (fieldnotes 5/19). Ariel exited the space without asking any questions, without understanding the space or any potential use of it, or even how she might go about furthering her knowledge of it. She

believed that she had no power to use the space:

Since I don't know what it is, I can't see using it. I mean, I know how to use the computers, but that other stuff makes no sense to me...I guess I could ask, but I'm not going to because sometimes these library people can be rude. They look at you like, 'You don't belong here.' (fieldnotes 5/19)

They Give This Look.

Ariel was not the only person to behave in this manner:

I keep seeing people peering into the space, sometimes through the glass wall, perhaps wandering through, then leaving without speaking to anyone. Today it was two women, both white, both older. One had a boy of about 8 with her and was holding a book bag. She came in at around 2:30 and wondered around ... Later, at around 5, the other woman looked in. I was able to catch up to her when I left. I tried to get a few words from her—and did, she answered my questions beautifully. But I had to scrap those notes because she did not want to sign the consent form. I will just say that she had no idea what the space was for or how she'd use it, nor did she want to “interrupt the librarians” who looked busy, to ask questions. (fieldnotes 5/24)

In my observations, white men seemed to have fewer problems trusting that the space was meant for them:

Around 4, a white man about age 35 came in, looked around for a moment, then walked up to Martin, who was working on the Espresso [bookbinding machine], and started asking questions. No hesitation. No waiting for Martin to not look busy. Unlike the woman I spoke with earlier there seemed to be no concern... I see this happen every day or two ... I've never seen a white man leave without figuring out the space, and I've been looking ever since earlier in the month...I've seen women of all skin tones leave after looking bewildered, and men with darker skin leave, but never a white man. (fieldnotes 5/24)

Luisa and Aaliyah were twenty-something women of color who only used the library to use the bathroom when they hung out in front of the Productive Library. Still, they said, said they wanted to make things,

Luisa didn't think librarians would help, or would let her make things she's interested in (street art, especially with paint pens), Aliyah also thought that, and is interested in learning to cook. She said she knew libraries would never do that

kind of making. When I said I had and other libraries did, she was surprised and interested. I asked if they'd want to do laser etching or 3D printing and they both looked actually appalled ... by the idea—they said they had no idea how to do such things. When I asked if they would ever ask the librarians if she could learn street art in the space, Luisa looked at me as if I were insane. "I would never ask *them*, they would just think I was going to graffiti the place. And I don't like asking questions anyway. They give this *look*." [She modeled a stern, slightly revolted expression, tightly pursed lips] Aaliyah agreed. "They would never add cooking stuff for me, and I would never ask them for anything." (fieldnotes 5/19)

When I asked if these non-users felt that library staff could assist them in learning to use the tools, they expressed a distrust in the library staff's willingness or ability to help them. Sometimes this skepticism was scornful. Non-user Luisa, and user Perry, who had advanced skills in music production, did not believe the library staff would know anything useful or be able to teach them how to use the tools in the space. While Perry was simply confident in his own expertise, Luisa stated, "All those librarians know how to do is check out books and yell at you if you fall asleep."

My conversation with Anthony made this distrust clearer. He expected that the staff would distrust him, and he doubted they would be helpful or welcoming for people like him. When Anthony spoke of the kinds of making he might wish to do, he believed the staff would doubt his ability to be safe:

Well I used to like to make little wooden animals. They wasn't very good... I would take a knife and a little stick out—like a little sitting cat or a dog or once I made a snake...Can't do it here.

S: Why not?

Well, it's pretty messy. I don't think they like me bringing sticks and stuff in here. Or a knife. That might be dangerous, they think...They not going to let me do that.

People such as Luisa and Anthony foreclosed their own ability to benefit from the library's offerings out of distrust for the institution. Rose had more faith in her own abilities than Anthony or Luisa, perhaps because she had worked for years in an office of a major multinational company. She believed in herself and her own needs, and was able to pepper the staff with

questions, but she also identified a certain amount of disdain emanating from some library staff:

That's my thing, to try to find out. And I know stuff, and I came... Not that I know stuff, but I do know the basics, and so I haven't exactly felt intimidated. But I could. And so then I started to like—I been here so many times, like 20 or 30—and I started to observe the [library] associates and just to see... Because if it has something to do with who comes in here, the perception, if they have a different... If it's okay for some people to ask a whole bunch of questions and not okay for some people to ask questions. And not necessarily okay or not okay, but you know, the tone.... I've had that tone myself when I've had to ask a question.

But some staff were trustworthy, Rose and Anthony reported. Rose liked and trusted Nick:

This guy right here. [points at Nick, laughter] I'm calling you by name. You're wonderful. Him, yeah. He's like wonderful. He's got such a pleasant attitude. You know what I'm saying? And so you don't mind saying, "What is that?"

Anthony trusted Aaron, who worked in the makerspace and technology center:

Oh yeah that boy Aaron is a good guy. He always nice to me anyway and I seen him help out some other guys. There's another one whose name I don't know— young white guy who's always pretty good. Smiles at me. Don't treat us like we're just shit on his shoe.

The staff at Productive Library were helpful when approached, from my observations. They were friendly and eager to assist. There was variation in the style of assistance, and the extent to which they would assist, but I rarely heard a staff member say a clear “no” to a patron request, nor did I see anyone in the makerspace scold or deliberately snub any users.

The person who ran the space day to day, Jenna, said access was the whole point of the library: “Libraries are here to enrich the lives of the communities around them whether it's with access to technology, access to information, access to books, access to play.” But my first day at the space had illuminated some of the barriers to access, alongside the access that the library was willing and able to support. A young bearded white man, Parker, was making stickers for work and printing panoramic photos he had taken on vacation. He also made two eight-foot banners. It was cheap—at the printers, he said, one might pay 30 dollars for one of these panoramic prints. Here it was ten dollars for all the photos. The quality looked pretty good, Parker thought—not outstanding, but good enough for most people.

Parker knew the space existed because he had, “stumbled across it” online. He said there was nowhere else to do this stuff for free. He had been looking for a cheap option to make stickers about biking in the city. He wanted to play with the 3D printers, which he had never used before. Parker wanted to make a ring mold to cast a ring for his girlfriend, because he could not carve one himself—he had no carving skills.

He pointed to a photo of his cat which he had superimposed in front of a photo of explosions. He had gone to design school and was familiar with programs like Illustrator and Maya. He did his design work at home. As we spoke, Parker would go over to the vinyl printer and make sure that his printing was laying flat. When the banner or printout hit the ground he would smooth it out on the floor so it wouldn’t crumple or jam. Then he would return to the cutting table to work on his panoramic photographs.

Parker had been a member of a paid makerspace with woodworking equipment. It was just a few blocks away. He said he would pay the membership to that space again to get access to those tools, for woodworking. It was different from “your dad’s garage” because he could be in a room with people and they had skill sets. It was “fun to work with groups if you have a vague idea of what you want to do.” It was different in the library space, where Parker came in with the things “already made” (on home computer) and just printed out the final projects. As he printed, I noticed that the “function” button on the machine was taped over, so users did not press it.

I asked him how he knew to use the equipment. Parker said that the staff told him all of that. According to Parker, the space offered attainable learning and the people at the Productive Library were good at explaining: “If you don’t know how, they tell you.” He liked how the tools were accessible, “if people were knowledgeable enough” to use them. As he was talking to me, he started to cut out his photos using a pair of scissors that were laying out on the table.

He mused aloud, “I wonder if they have an X-Acto knife.” I thought to myself that they probably did, but he started to pack up his stuff. It looked like he would rather go home than ask the staff member for something. I paused for a moment, then mentioned that the library likely had an X-Acto knife, and said, “I think you have to ask.” He walked over to Colin, and diffidently

asked if there were a possibility of using a knife to cut his photos. Colin brought him the blade without hesitation.

Parker cut up his photos and talked to me a little longer. He said he wished there were a miter saw and other woodworking equipment in the space. But he said that he knew of course that could not happen. I asked why. He said it seemed too dangerous and probably would not be legal. I said that the last library makerspace I had been in had a full woodshop. He seemed surprised by that, but still thought it would not work in here. He said people “would like to have access to that stuff,” and “people would take advantage of that—in a good way.”

He finished up and said goodbye to me. He left the scissors and X-Acto knife and ruler on the cutting table and put his rolled up panoramic photos into his backpack and left. Colin came over and put the knife away. The knives were always available for patron use, though kept in the staff-only corner, where there were a couple of cabinets. I asked how people know about the knives, and Colin said “Well, they just have to ask for them” (fieldnotes 5/4).

You Don't Know That You Don't Know, and You Don't Know How to Find Out.

The need to ask questions or permission became a recurring concern in this space. Parker and Colin described the complex negotiations of physical, intellectual, and sociocultural access in the space. The staff expected the people using the space to ask them for materials, tools, or assistance. The library workers believed the users would be comfortable asking questions and for help (Jenna, Nick, Colin, Adam). This was often not the case. Nor were questions always welcomed.

Rather, as user Rose noted:

Asking one question seems to be acceptable with the associates, but if you ask this question and that question, this question and that question, about the equipment or about the computer or whatever, then people start...[she widens her eyes, backs away, and waves her hands to signal a frantic “stop.”]

Like Parker, Rose had found out what the space was for and how it fit into the context of her life when she took her own initiative. She described a struggle in not knowing what questions to ask.

She conjectured that “people perceive asking questions as being uninformed and so they don't want to ask questions.” She asked them when she got a hint of possibility. This was how she learned about Lynda.com, the online educational site the makerspace provides free of charge. This was how she learned that she could take the place of people who do not show up for their reservation slots to use particular tools. This was how she learned what she was allowed or not allowed to do, such as using her own iron-on paper. And this was how she learned to deal with an almost unusable tool-reservation interface called EnvisionWare. This was software that stymied many users—and it was such a known problem that the makerspace staff were agitating for some new software to replace it.

Rose negotiated her own intellectual access to the space, making sense of the things she saw there. She spoke of the tensions between personal and institutional responsibility, being careful to distinguish her own processes of sensemaking from those of others:

That's just how I do it... it's still up to me... you can have all this information sitting here and often sitting right in the building, and nobody told me... Well, first of all, my mama don't work here, you know what I'm saying? And whose responsibility is it to tell me? You need to give me some clues. But it's my responsibility to know. But you don't know that you don't know, and you don't know how to find out.

She further described:

[The makerspace has] got barriers. ... Like in the other new libraries, they meet you at the door. Pretty much when you walk in the door, they have a lot of availability, and they have their laptops. So they see you walking up the walkway and they're already ready, and when you walk in—I don't know how much I like that. I've kind of gotten used to it—But they say, “How can I help you today?” So they'll like reach right up to you. And sometimes you might not know what you want or something. But in here they don't do that, so a person could walk in here—Like, see that lady coming? That lady, if she turned and walked in here, you would... I mean, you walk into that space right there, you don't know what to do.

Rose was observant. In this library, a huge glass wall separated the space from the other areas of the library. It had some words printed across it: MAKERSPACE – CREATE – COLLABORATE – INNOVATE. A glance around the space reveals no other signs telling users where to ask for

help or to orient them to what the space was. The few signs in this space were directives about policy, or involved information about how to use a particular tool. The signs told users who could use computers and for what purposes; that no eating was allowed at the computer, and described costs of materials. A few printed manuals had instructions on tool usage, but these were not always obviously available.

This lack of signs or direction was not accidental. The library administration wished to keep signage to a minimum. Staff member Nick pointed out:

Signage has really kind of been frowned upon throughout the library because... from what I've heard there's a particular person in administration that has an idea of how signage should be used, and some of this other signage that's around, we just don't want it out because it's not wanted.

A directive about desks had recently shaken the staff. Instead of having set desks or locations where staff worked, the library had adopted a “deskless model” of service. In this type of library, staff roamed the stacks and spaces, seeking out people to assist. While this model seemed like a proactive way to ensure that patrons were receiving help at their point of need, and that they need not go request help from a seated librarian, in practice patrons said they often could not find a staff member to help them:

Hunter and Tanya were complaining about never being able to find a staff member to help them in the library. They were discussing the deskless model, though they didn't know what it was called. They said, there used to be desks where people sat to answer questions... They wondered if a bunch of staff had been let go. (fieldnotes 5/13)

In the makerspace, this was a real issue. The library staff looked similar to many of the makerspace users: young, white, largely male. It was hard to tell who was whom, especially since the staff often sat at the various design computer desks or “collaboration tables.” They looked just like library users in this space, and very little like the library users in spaces such as the Tech Center.

When I wanted to find out things about the library, I also struggled to know how to ask. The staff in the makerspace were approachable in my experience, but I was intimidated by the

upper administration. I was told my first day in the space that I should never approach the director without the director's express invitation (Jenna). One day, I almost broke that rule:

I saw the library director, Kimberly, waiting for an elevator when I was going to lunch...I'd seen her in the library several times now. I recalled what Jenna had said about her temper when a staff member engaged with her without her signaling acceptance of some interaction in advance. I decided to email her again, instead of chancing her anger or potentially being asked to leave my study site. (fieldnotes 5/23)

The staff suffered some of the same confusion that I and the other library users did. For example, the people who ran the makerspace were left in the dark about a set budget. There was even confusion about who was in charge of the space. Jenna believed she was, but Chuck believed he was. He was the person above Jenna in the staff hierarchy, but rarely entered the makerspace. Jenna was in the space daily, and had been told she would be in charge of the space when she was hired. There was a significant communication gap between library staff and library administration, and the workers were wary of asking for clarification. They did not know who to ask, how to ask, or when was the appropriate time to ask. Jenna shrugged, "I keep my head down and do my job and they'll tell me if I can't have something [for the space]." She had no idea if she could purchase equipment or materials until she proposed it and the proposal was either accepted or shot down, with the reasoning behind the decisions not made visible to her.

That Polices It for Us.

In Productive Library, the equipment scheduling rules and software was the greatest barrier to use, aside from sociocultural access limitations for some communities and individuals.

EnvisionWare, the software, had settings

that precluded not only any dual-use of equipment, (for example one could not use a design computer and the laser etcher at the same time), but a user could not finish one task early and schedule a different piece of equipment, even if the equipment were not in use. The software did not allow it.

The software was challenging to grasp, with each piece of equipment labeled in incomprehensible code. Sometimes users would come in thinking they had scheduled time with the laser etcher, to find they were stuck with the audiorecording conversion equipment (Sean, April, Lina). This led to tears or shouting on occasion (Jenna). As much as Jenna and the rest of the staff disliked the software, many saw it as invaluable because it seemed like a neutral intervention when it came to extending users' time on machines:

We needed EnvisionWare because EnvisionWare will kick you off [the computer], right? So if we had to have this written list, I mean someone would have to be there policing it all the time and people are already like, "Can't you just give me an extra five minutes. This print's going to take two minutes longer than it says. Can't you just extend it?" And I'm like, "No. There's no possible way for me to do it. When the computer shuts down, your time is up." And we need that badly ... because that polices it for us and there's nothing we can do about it. I can't go,

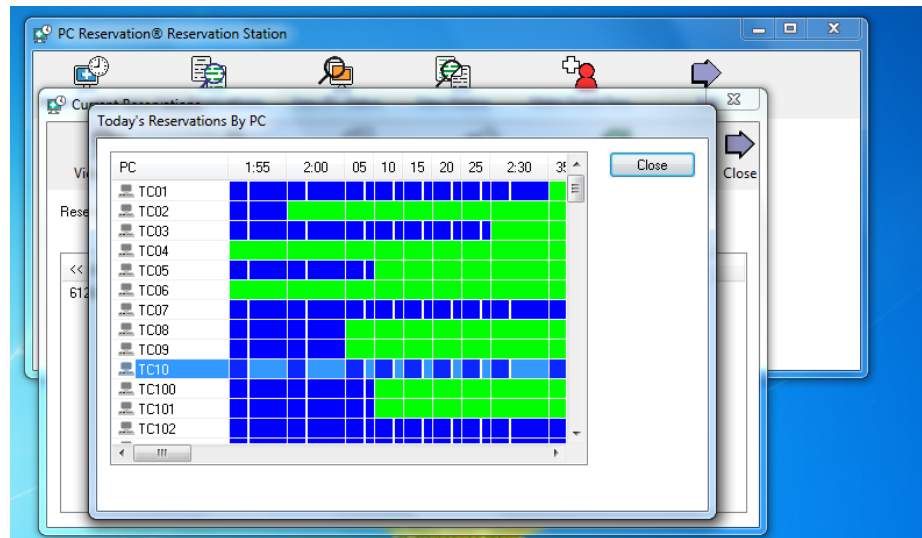


Figure 10 The reservation software interface. For example, "TC10" indicated the Laser Cutter/Engraver, but there was no key or guide for patrons to select the equipment they wished to use.

“Okay I'll give you an extra five minutes” because there's a reservation right after theirs. So it won't let me do anything. And we like that. That's the best part of the whole thing. (Jenna)

The computers saved the staff from the emotional labor of being the “police,” but their inflexibility meant that users were sometimes unable to accomplish their tasks.

Is It Designed for the People or Is It Designed for the Rich People?

Rose identified costs (of both materials and printing fees, as well as the expensive downtown parking costs) and potential social stigma as some of the barriers to use this space. She noted,

This makerspace and all these other functions are funded by somebody. And the people who are on the board make the decisions about what it is, how it's gonna get funded, who's gonna use it, what it's gonna cost and all those things. And they dream about what the expectation is... And you only charging two dollars, or ten cents for everybody. Well, that's well and good, but people don't have ten cents. There are people who don't have ten cents... If you were sitting on the board and you're rich, you can't even perceive that there's somebody that don't have ten cents... Because by the time you've parked for \$3.25 an hour, you know what I'm saying? And all of that... Is it designed for the people or is it designed for the rich people?”

Rose was using the makerspace to create pillows to give to friends, but also began a wide-ranging anti-litter campaign for her community. She began by making buttons saying “Don't litter” and handing them out to community members. She initially had self-funded this project, but then could not afford her own success. She sought out (and received) local corporate sponsorship for the campaign. The seemingly low fees the library charged for materials added up swiftly for some patrons, such as Isaiah, Gladys, Lina, and Felicia, who were doing large scale prints, button making, book printing, and graphic design printing. This was especially true for those making many things, rather than only one or two. Others, such as Dana, Parker, and Roderick, felt the costs were low and welcomed that. Each of those users was engaged with large-scale printing.

Policy shifts also impacted access. Partway through my time in this library, a change in

policy limited the users' ability to schedule as many pieces of equipment as they wanted whenever they wanted, to only six reservations in six weeks. Some staff, like Colin and Jenna, thought that perhaps this would stop the problem of people making many appointments for desirable equipment, but only showing up for some of them. Others, like Nick, thought it would cause trouble for established users of the space. The policy significantly impacted access for users who were used to coming in a few times a week to use different tools. The shift in policy made it impossible for users to make things as a regular practice. For makers like Rose, who came in several times a week and used a variety of tools, such policies spelled the end of the utility of this library makerspace.

That's Above My Capabilities.

The staff at this library assumed that everyone would be comfortable asking for help, for exceptions to rules, for ideas on what to make.

I noticed a youngish African American woman enter the space and wander around looking at the exhibit cases. She looked over at the equipment, but it was like there was a line on the floor she would not cross to look closer. After about 5 minutes, she left without speaking to anyone. I asked Colin about this behavior, and he said, "She probably doesn't know what's going on here."

We talked about this for a few minutes. His feeling was that she was welcome to ask anyone to give her a tour or explain things. I said maybe she was too shy. He just shrugged and said, "We try to be friendly."

I continued to think about this. I don't know if the staff are seeing what sort of emotional labor is involved in having to ask for help, to ask for explanations. It takes a resilient and outgoing, socially comfortable person to do all of that, I think—I'll need to ask some people about that. I wonder what accommodations are made for those with social anxiety, lack of trust in librarians, or other reasons to not want to ask for help. (fieldnotes, 5/9).

Later I watch a young white man, Victor, work with the laser engraver to create plaques that can be added to the dashboards of classic cars that participate in rallies. He has brought his own wood with him, beautiful slabs of cherry and walnut wood. He wanted to use some barnwood from a tumbled down building his family owns, but he was told that there might be some toxic

finishes on that wood that could cause health issues if lasered. He carefully covered the walnut with a layer of blue painter's tape; Nick told him that this would reduce the blurring of lines caused by smoke on the wood when the laser engraved it. As he worked, Victor told me,

I think this place could be pretty intimidating to read about it online and think, "Boy, the list of what those machines or devices can do is really impressive, but I think that's beyond my scope." And those people might just see that and think, "That's above my capabilities, I'm just not going to go." That kind of thing. And there's a few people I talked to that had come in here that kind of said they'd had that feeling, but once they got in here they're like, "Wow, this looks a lot more approachable and attainable than I thought reading online." ... It's really light-filled and there's a bunch of friendly staff helping, lends to that. I think if they put this in a basement like maybe a lot of institutions would say, "Oh, well let's try out this whole Makerspace thing." ... We'll just have a laser engraver in some cave and send people down there to use it.... [Here,] it's like the newest side of the library with floor to ceiling windows.

Meanwhile, in the same library, Anthony, the older African-American man who was without a fixed residence, described his comfort levels in the library or the makerspace:

I only come here to have something to do in a place that is comfortable ... The furniture is okay and I get along with most of the librarians. Some of them are really nice and some of them are assholes. There is one guy makes it very hard. He's always snapping and banging on shit to wake people up. If he is working I just leave.... Sometimes he'll act like he's real sorry but the rules is rules... Like the rule about sleeping. The rule about food and water and stuff.

Anthony described his use of the library—as a space to be comfortable in bad weather, socialize with people like him, and to entertain himself—as contrary to what the library was for. His body, his use, his understanding of the library—all these were uncomfortably negotiated through resistance to library policy and procedure. When I asked Anthony if he would want to use the makerspace to make things with his friends, he demurred, "I don't see people talk in there. It's real quiet. I don't think people are having fun with their friends."

What Is the Prerequisite?

Rose was also sensitive to the issues of socioeconomics, people's dispositions, and the

problems of feeling comfortable in the space. She empathized with the struggles of those who might wish to use the space. She said, “The people who are really new and feel insecure and want to do it but don't have the vocabulary ..., Who is this facility for? And what is the prerequisite?”

She believed there was not supposed to be a prerequisite to using the space, and that anyone with a library card should be able to use it. However, she said, many people were uncomfortable in the space. She was emphatic that some staff made users uncomfortable in asking any sorts of questions, while others were very supportive and proactive in offering assistance and answers. She wanted them to be more proactive and more welcoming:

There are lots of ways that you can reach out to the people. You can say, “You're welcome in the Makerspace, and don't be intimidated that you don't know nothing. Please come anyway.” You know what I'm saying? Or... And then you give me all of this and I already am set at ease, and if I don't come, then that's my problem.

Being comfortable in speaking up was a key challenge for some people, but not for others. Just as Rose described herself as happy to ask questions, Alison, an African-American homeschooling mother, said she was “accustomed to advocating for her family,” and that she assumed that things are not always as they were advertised, so she asked a lot of questions. On the other hand, Dana, an older white woman, identified problems with feeling comfortable in asking questions:

She did wish they had an instruction manual on how to work the machine to read while she was waiting. “Anytime I can NOT talk to a person and figure it out for myself” she prefers that. She likes to not look stupid, but “good.” Because she likes to read instructions, it makes her feel more competent. She didn't want to “waste time” on the basic elementary stuff, she preferred the staff to be there to help problem-solve. (fieldnotes 5/6)

This dispositional comfort in asking questions or for exceptions to rules mattered in this case. Questions were often the only way for users to learn anything about the space, rules, tools, or possibilities, since there were few signs or orienting programs in the Productive Library space.

Some people had no problem with questions. I watched a 40-ish white man pummel staff members Randall and Kyle with questions about the laser cutter:

He wouldn't press any buttons without fetching one of them, even in Illustrator, on his design. Randall and Kyle appeared happy to help, but I saw Kyle roll his eyes at Colin when the man fetched him for another question. The man was attempting to etch a mirror and Randall helped him cover it entirely with blue painter's tape. He was VERY nervous about the laser bouncing around off the mirror... (fieldnotes 5/18)

The space itself was physically comfortable. Tables and padded chairs were plentiful, and the room was warm. Light shone through walls of windows on three sides of the space. The high ceilings and open room dampened the sound. Each person had plenty of elbow room, even at the more crowded areas around the design computer carrels. As Victor noted, "It's not so densely packed that you feel like ...you're crowded, and all the sound and noises kind of polluting your creative juices."

Periodicals librarian Sophia found this arrangement uncomfortable, for social reasons: "The furniture faces the wall...so no one feels like they can talk to each other." Fashion designer Sabian, young maker Sean, and Rose all described their discomfort in bothering other people. The arrangement of tables, each several feet away from the others, seemed positioned to reduce social interactions. The distance made it challenging to ask for help or to express interest in what someone was making without feeling as if they were intruding.

Other areas of social comfort were more challenging. Feelings of safety were complicated. The library was located in an inner city which was seeing tremendous opioid addiction issues. Some staff mentioned being nervous about not having desks to stand behind when confronted with belligerent or chemically-influenced patrons (Liam, Ashley, Jenna). During a scene in which a yelling patron attempted to force Ashley to kick out someone using the recording booth, security guards were called and ultimately police used their tasers after a long attempt to talk the man out of his aggression. He was arrested and later it appeared that he had been using drugs [fieldnotes 5/25]. Patrons during this scene appeared uncomfortable, shifting in their seats and watching the man from the corners of their eyes, presumably watching for weapons or violence, but not making eye contact. However, no patrons left the makerspace.

While people occasionally betrayed discomfort with the others around them, a certain level of social trust and safety was present in this library, which seemed to lead to comfort for some people. Perry, a middle-aged Black musician, chose to work in the makerspace, even though it was noisier than many areas of the library, because it felt comfortable for him to be surrounded by creative activities. He left his expensive computer unattended in this area when he went to the bathroom. The makerspace felt safe and comfortable to him in ways the rest of the library did not.

People Who Are Doing Real Work Here.

On May 18, the library creative place was humming with activity. Three men sat at the design computers—which were aimed at ensuring people had access to powerful and expensive design software, such as Autodesk software:

I spoke to some design computer users about how hard it was to share the computers or to get onto them with the reservation system. They seemed resigned. Jordan said he was annoyed that someone came to take “his” computer, for example, because he really needed to finish a flyer for a concert that was occurring soon. This had happened earlier in the day when he ran out of time and was booted off. The reservation software told him his time was up and that the computer would shortly shut down for him then watched another guy use the computer and covertly play a game when the staff were not looking, covering up the game with an unchanging and unedited photo on the Photoshop screen whenever he thought they were looking. Jordan said, “I wish they had some way to help people who are doing real work here, instead of the guys just playing with the computers.” (fieldnotes 5/18)

Jordan had learned to use the computer by playing games. He said the rules were good because some people were doing real work like him, but at the same time people were often learning the computers by messing around with games, so he was not judging anyone. Still, he was carving out categories of “appropriate” and “inappropriate” activities on those computers, that aligned with library policy.

There were large quotes on all the walls in the space. These were related to creativity and innovation, as well as skill-building. One inspirational quote on the wall directed people to

“innovate” themselves, comparing people to technology. As I watched Rose trim each of the iron-on aphorisms she had printed to place onto pillows and other gifts for people, I wondered if she were the target audience for such statements. She was an older woman, retired, using advanced design tools. Was she innovating herself? Was she doing the prototyping, learning, or innovation “uplift” skill-building or economically-advantageous activities that Jenna and other librarians said was the reason for this space?

I asked if she were learning the computer or equipment. And she said, not really...some basics of the particular programs she was using, like Illustrator, but that she had her own computer and had worked with computers for many years. ...She also said the vinyl printer was not really new to her—it was just a big printer, similar to those she’d worked on before. The laser cutter WAS new—but even then she just learned the precise way to prepare a file for etching. The only thing she was learning, she said, was how to press “start” and even that was not always allowed. (fieldnotes 5/20)

Rose was not learning much, or developing career-friendly skills. She was telling a machine to print something she had already designed or found. Her entrepreneurialism was in grassroots activism, not in making a new prototype of something to sell. Rose’s type of uplift was not what some library staff noticed or expected.

After I spoke to Rose, I asked Jenna to tell me what sorts of interesting things happened in the space (fieldnotes 5/18). At the time, Jenna was standing near the button-making tables, about four or five feet away, looking toward Rose. I’m sure Rose could hear us. I wanted to see what Jenna said in response, and if she would mention Rose. She did not. Instead, she told me about a couple of people innovating new products and starting new businesses using the laser etcher and the 3D printers. She mentioned the hundreds of schoolchildren that streamed through the space at times. Though Rose was standing right there, and Jenna knew her and what she did, she never

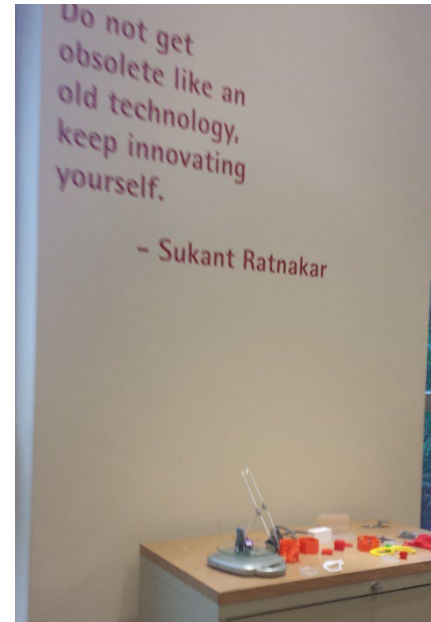


Figure 11 A quote on the Productive Library wall warned of precisely the obsolescence Ivan Illich said institutions made the norm, to the detriment of human flourishing.

mentioned Rose's activities, either that day or any other. None of the staff seemed to find what she was doing interesting, except for Nick. After I had interviewed Rose, another interviewee mentioned her to me, saying he had seen her on TV with the mayor, talking about the cleanup campaign (the makerspace was not mentioned in the TV news spot). Rose appeared to be making waves on local TV and with the mayor's office, but not in this makerspace.

Maybe He Didn't Think It Mattered.

The library was discontinuing access to the iron on paper Rose used. She was willing to buy her own roll of it, but it was heavy. Rose is a tiny woman of at least 65 years of age, though she seems healthy and fit. When I later picked up a partially used roll, I found it heavy and bulky—4 feet long. I wondered if she could manage it on the bus herself. The staff told her she could not store her own roll at the library, but that she could bring her own:

They told me that they were out of t-shirt paper, they just had one more roll plus what was up there, and they wouldn't have it anymore... [Nick] says, "Well, you can do that [buy your own paper]. But you don't have to do that right now because we got lots of paper." He said, "We're just not gonna restock it." So I'm going, "How much paper do you have?" He say, "I don't know, lots, lots, lots." I said, "For real? Well that's not what the [other] guy told me." He said, "If you will give me a few minutes, I'll walk to the warehouse or wherever and I'll let you know exactly." So he comes back, he say, "We got enough to last probably a whole summer... So see? See how the information—? Because maybe the [first] person was on burnout or maybe he didn't think it mattered.

They type of making Rose was doing mattered to her, but it did not to some of the library staff. The staff sometimes dismissed concerns about inconvenience for users. As Chuck said of the staff's perspective, "If you're down [because the equipment breaks], it's a hiccup, you don't like it, but...you're not losing any sleep over it... It's not *profits*." He appeared to consider access to the equipment a favor the library was offering the community, and that unlike paying customers, these users should not expect access. The fact that the taxpayers did pay for the library services did not translate into an expectation of access—even though staff called the people in the space their "customers."

Some of the staff dismissed the users' needs for the equipment, which sometimes *was* the user's business. I watched as graphic designer Jordan was kicked off a computer one day. Jordan based his entire business on using the library computers, since he could not afford either a highspeed computer nor the expensive design software himself. He said he was annoyed that someone came to take "his" computer that day, because he needed to finish a flyer for a concert that was occurring soon. But library staff stated that the space was not intended for business use (Jenna, Nick), even as they wanted users to be entrepreneurial or innovate new products in the space.

Anthony also saw institutional preferences for particular activities in the library, which did not map onto the realities of what the people using the library wanted. "Because you know they tell us don't talk and I don't think they want us to watch video on the computers. I think they want us to do job stuff or learning," he said. "I don't know why they have that [makerspace]. Maybe people are learning stuff or doing their jobs there." The tools that the library purchased reflected the activities that the institution wanted to see pursued. So the library purchased hundreds of computers for use in the Tech Center, but six for design work specifically in the makerspace, and only one vinyl printer, despite a heavy demand for more.

Rose gave all of her creations away. And she was not unusual in the types of making she was doing or her reasons for her making. Brent was working on the laser etcher, etching pint glasses. I mentioned that he could make some money on those glasses—they looked beautiful, with a local sports logo on them. He talked about giving away everything he made in the space: "I just like to give stuff I make to people" (fieldnotes 5/21). Many of the participants in this study, were making things not only to learn—though learning was valued and one of their goals—but to support their communities (as teachers, parents helping other people's children, youth advocates, or as members of civic organizations). They were not making money from their products.

In Productive Library, some of the gifts included Victor's laser etched wooden badges for participants of car rally races—for free distribution. Jim used the laser etcher to create a remembrance plaque for a friend who had miscarried. Dana was making banners for student

athletes to ensure even the kids that could not afford one were included in a school tradition. Gladys wanted to print a pocket calendar for sale to benefit at-risk youth in her community, giving away her labor and proceeds to a cause she believed in. Nearly every one of the people who spoke to me at these makerspaces was focused on creating objects that operated outside any marketplace. Instead they were building relationships through making—but they furthered those relationships mostly outside the library.

There Is No Perfect World.

In such a large community, it was challenging to ensure everyone was able to get what they needed in the makerspace. In an attempt to ensure better tool-sharing for the community, individual activities in the space were being curtailed with new rules enforcing limits on how often one could reserve the equipment. Makers were going from as much access as they could get, given other people's reservations, to a strict allowance of six reservations in six weeks. These rules were handed down through Sheila, the administrator above Chuck, who was above Jenna. No one on the makerspace staff were present for the decision-making around this policy. Instead, Jenna said she received an email saying, "This is the new policy, please notify the users," and she began to make signs. Someone in Computer Services was reprogramming EnvisionWare to accommodate the new rule. Some users thought this was more fair for everyone (users Victor, Jim). Others were disgusted. "It's like they want to make sure no one can really get anything done here, they can just sample this and sample that," said Rose.

Other clashes arose as people negotiated the shared use of tools and spaces. Liam and Jenna described people covering up their work when someone looked over their shoulder, though I never saw anyone do that. Jenna also described people being angry at one another for using the equipment when they wanted to use it, and I saw two violent outbursts of such aggravation during my stay in this library, both related to sharing the audio recording equipment.

When users such as Jordan were kicked off of the computers or other tools, the software

was a main mediator of individual use versus communal use of the space. The head of the makerspace and tech center, Chuck, pointed out that there was never going to be a perfect technological solution to the conflicts the space and users saw when everyone wanted to use the same piece of equipment (e.g the recording booth or vinyl cutter/printer):

I don't think it's fair that you got one person who's reserving the vinyl printer for six weeks out every day at such and such time, I think that's unfair to block that from everybody else... The problem is they don't show up everyday. And then we have people fighting over the time frame when it's open. But there's no... There is no perfect world. Even if we get this new software and reservations, that's not gonna stop a lot of that stuff.

Not only was there some tension about sharing equipment, heavy community use meant that things broke, especially the delicate book binding machine. Sometimes things were stolen. Recording equipment had to be replaced, then required “signing out” when users stole or destroyed it (Chuck). Multiple items were retired from service because of issues with community use—including the EggBot, soldering equipment, Little Bits, and so on. In this case, the staff had few qualms about it being “unfair to block that from everybody else” (as Chuck described user behaviors), when the library chose to block access to those tools, which languished unused in closets and staff spaces. Such tools emerged during tightly-supervised programs, which rarely occurred in the space.

The negotiations between the community needs for the tools and each individual needs were constantly shifting, with each staff member applying different ideas of what was “important enough” (Aaron) in an individual case to override rules intended to support community access. Their reliance on the technological solution of reservation software eased, but did not obviate, the stresses between communal and individual needs.

I Don't Have Time to Build These Kinds of Bonds.

Outside the library one morning, I waited in a chaotic queue of people for the doors to open. Many of these were people without homes, awaiting a place to stay warm and dry in the Tech Center, but a few were there for appointments to use the vinyl printer or design computers

(fieldnotes 5/14). The joking cordiality I saw outside faded as the queue entered the library doors. Conversations withered or stopped. People went to their different corners of the building, or to their different tables. The community that was visible outside the space became a collection of individuals inside.

Some pockets of social engagement remained, at the design computers in the makerspace:

I watched the design guys for a while, they were sharing ideas and I saw one lean over and help another with an illustrator project. They joked and laughed a little bit. I realized I never saw people really doing that anywhere else in the space and felt a jolt of surprise—isn't that a main thing about these spaces? It even says so on the glass walls: collaborate. I look around the room. Everyone is so far away from one another, each in their own small zone of personal space. But the design guys are crammed together and despite the privacy carrels most of them seem happy to chat and share. There is one guy I see who is conspicuously not participating in the chatter, and keeping his head down. But the other 4 men (all African American and probably late teens to 30s) seem to know each other a little bit. I ask them and they say they see each other here sometimes, and they like to help each other and sort of hang out, but mostly they are working on their stuff. Still, they speak of proudly sharing their finished projects with each other, getting advice on design, etc. (fieldnotes 5/18)

This chattiness and sharing was not a constant in this space, where most people kept to themselves. With exceptions like the gregarious Sabian, or confident Victor, few people spoke to each other in the makerspace.

Some people wanted more social activities within the space, like Anthony. He said, "It can be maybe a fun to make some stuff. You know with your friends. Like if you were making some buttons with your friends or singing songs with your friends." He socialized with his friends in the Tech Center, but considered the makerspace to be off limits for such activities.

Photographer Marla said something that I heard echoed by other makers: "It's not really a hangout space, is it?" she asked. Others seemed interested in socializing while making, but also did not see the library as a social or gathering place (Sean, Parker, Victor). Some people came with friends, such as Beth and Melissa, but felt intimidated by the space or confused about what they could do together there. They wanted to use the creative place as a social destination, but felt

stymied by a lack of intellectual access.

Yet the Productive Library did not hold specific programs or meetups, or did so rarely. One exception was a weekly quilting meetup. I saw a few women arrive for that meetup one week, none the next. During some Saturdays, some programmed activities were available, on a drop-in basis, but I never saw anyone attend, with the exception of the daylong library-wide “ComicCon.” The calendar listed weekly one-on-one opportunities called “Maker Academy” after school was out every Tuesday afternoon. One Tuesday

I waited around, hoping to see what happened during the Maker Academy, but no one arrived. Just as during the drop-in Raspberry Pi gaming event and, one of the homeschooling events I observed, few took advantage of the scheduled programs. When I inquired about attendance at the Maker Academy, no one had taken advantage of these opportunities for several months. Colin seemed surprised that the event was even still on the calendar.

Instead of attending programs, people sought one-on-one help on an ad-hoc basis, and the staff responded to those requests whenever possible. In the previous year, the staff had provided programs for people to learn to use the various tools or make particular projects, but found those to be either sparsely attended or “not worth the time” (Jenna). The users were intended to come in alone, make their items, and leave—generally without interacting with anyone else. It was not a socializing space (Jenna, Nick, Liam, Sean, Victor, Marla, Sophia).

When I asked library workers about the desire or possibility—from the library’s perspective—of any sort of community of practice of makers in the space, many staff members seemed either dismissive or as if it were already occurring. Jenna pointed out Sabian, who would talk to anyone as he worked. She said she saw people help each other. Adam said he saw that helping too, but most people liked to be left alone. Aaron told stories of people helping each other, at the design computers. He believed the ideal process would involve people training each

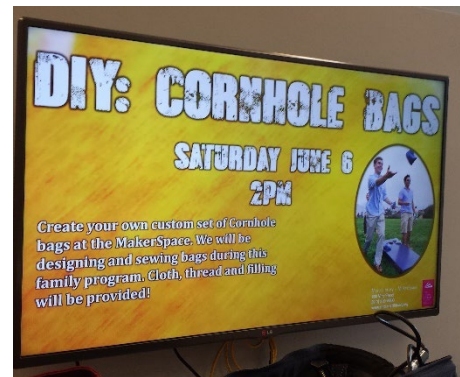


Figure 12 One of the drop-in programs available at the Productive Library space, which occurred after I left.

other, “That’s what it’s all about.” Jenna, Colin, and Nick also said they wanted to build more of a community and increase peer-to-peer interactions in the space, but felt constrained by not enough time, institutional support, and their own innate reserve.

Jenna described the lack of social connections she was able to make with and between patrons in terms of time, “I have to help six people at the same time. I don’t have time to build these kinds of bonds.” But then she went on to delve deeper into her reasons for not fostering more social interaction between people interested in similar types of making:

Maybe it’s because I internalize that a little bit and I go... It’s not something I would necessarily want people to do for me ... I think I would rather approach that person myself... If someone was like, “Hey this person, you know, also does this thing and it’s interesting.” I would be like, “Oh, okay. Well maybe I’ll reach out to them when I want to.”

She invoked a desire for privacy and treated others with the hands-off treatment she preferred. And she was aware that some of the activities in the makerspace might conflict with previous library expectations of privacy:

The library’s whole experience with technology thus far has been mostly with creating privacy, you know. Like people need to be able to access the information and don’t need other people to see it and with Makerspaces and large collaborative spaces we’re like introducing the exact opposite... Getting rid of privacy. But there are still people that are going to want privacy. So how do you create a collaborative atmosphere while still allowing some users to have complete privacy? It’s almost impossible.

Jenna raised the example of the “collaborative tables” that were in the Productive Library space, which had LCD screens and plugins, and were aimed at groups working together to make things. In my observations, these tables were almost never in use. I saw a few people sit there either alone or with a friend they arrived with. The only time I saw strangers engage with each other at those tables was when I was one of the people involved, and reaching out to engage with others.

Jenna said people wanted spaces to create together, but wanted privacy as well, so such tables would be better used if they were enclosed spaces, like glass rooms, to avoid “unwelcome attention from other people in the space.” In my month in the space, I observed one person in

the space appearing to suffer from such “unwelcome attentions,” however: the man at the design computers who kept his head down and did not engage with me or the other people that were talking. The desire to be “alone together” as Jenna described it, must have been valuable to some. Yet none of the patrons I spoke to mentioned wanting such a thing. Rather, they described wanting to connect with other users more. Even Brent, as self-contained a maker as I observed in the space, and who described not wanting the space to be for social gathering, described his enjoyment of watching others make items and wished for some kind of show and tell activity to see what others made.

Jenna was concerned about navigating privacy issues while also supporting the patron’s desires to engage with one another, and decided to not encourage that engagement, perhaps based on her own preference for privacy. Jenna also described privacy issues in terms of intellectual freedom. She told a story about a photographer who used the vinyl printer to create large-scale nudes.

Jenna was worried about kids coming in and seeing the nakedness, but did not want to stop the woman from being able to print, so she stood in front of the printer, blocking the images from view of anyone coming near. She said the artist’s intellectual freedom was important to her, but she worried that “someone would throw a fit” about the nudity. She was worried about a conservative patron causing trouble or advocating for restrictions on content in the makerspace. “I don’t want anyone telling people what they can and cannot print.” Jenna was proud of her problem-solving, portraying this incident as her fight on behalf of artistic and intellectual freedom. (fieldnotes 5/11)

One day, I met the photographer in this story, who had a very different point of view. Marla was a woman in her mid-20s who had tawny skin and curly dark hair. As she printed a few photographs that were about 3 feet by 4 feet in size, I spoke with her about what she was able to create in this space. She was complementary, saying that the space made it possible for her to participate in art shows with the large-scale prints she could not afford to have made commercially.

In Marla’s version of the story, Jenna had been bothered by the nudes she was printing

out, and had blocked anyone from seeing what was unspooling from the printer. Marla had felt uncomfortable, as if she were doing something wrong, but also angry because she knew she was not. She felt marginalized and silenced: censored. Marla rolled her eyes, “It’s just art you know, calm down.” The photos that I saw printing were well-executed images of transgender people in abandoned buildings and alleys. Marla said she subsequently did her best to hide what she printed at the library. I watched then as she carefully placed her body in front of the printer and at times folded the printout over itself to conceal the images. One of the images depicted a trans man who had just had top surgery, and the fresh scars were visible on his chest. There was no other nudity in the images. Marla said she still printed nudes, but she was careful about it. “I don’t do it when *she’s* here,” pointing at Jenna.

He Wants the User to Discover the Knowledge.

I saw many instances of the staff’s generous helpfulness. One day, I saw Liam use his own library card to sign in a man into the recording studio, because the man did not have a card or the ability to acquire one, due to old library fines. Liam said this was a somewhat common practice, that staff would do that because it was often easier than getting the user a card. Another day I saw Adam help someone on the design computer for over an hour after his shift ended. He volunteered his time cheerfully.

In this library, the role of conversation between staff and users was complicated by different understandings of what “help” meant. For Jenna it sometimes meant basic directions saying, “here is the tool... here is the button you push to print...” Sometimes it meant she stayed late and printed something for a patron, and even brought it to their home. For the other staff, help was instructional, with some going through a great deal of effort to teach or assist users. Some staff members in Productive Library said they did not wish to teach how to use the tools in-depth (Jenna, Colin, Aaron). Some library workers were noticeably more helpful than others (and regular users could identify those staff members), or were more helpful with some tools. For example, Nick and Colin often spent several minutes assisting users in understanding most of the

tools, while Randall assisted at length with design software or 3D printing, and Helen helped with the sewing machines.

Jenna described one of her staff members, Colin, and how he presented help rather than control or expertise, “He never said ‘I know how to laser etch or 3D print,’ because he wants the user to discover the knowledge on their own, and he should just be an assistant.” This hands-off approach was trained, and “over-helpful” staff were cautioned to stop:

Jenna said to Ashley, “fake it until you make it, or people won’t take you seriously,” when Ashley was bemoaning the fact that she didn’t know much on her first day. She then scolded Ashley for helping a person on the design computer too much. “He can learn all that on Lynda,” she said and Ashley looked sheepish. I was surprised because that seemed like slightly contradictory advice—to look like an expert, but don’t actually give expert assistance. (fieldnotes 5/24)

Some staff members stood back and waited for users to ask for help. Others swooped in proactively to assist, or took over. Some offered a false sense of control and making, but “pushed all the buttons” (Kent).

One Tuesday morning, I watched Layla working on the vinyl printer. She was making a vinyl banner. She laid the banner on the cutting table, where Jenna had thoughtfully anticipated her need and laid out the grommet setter for her to use. Layla said to me, as she was smoothing out the sign and admiring it, “I need to put those metal reinforcers in the corners so it won’t tear. I wonder where I could do that.” I told her that the tool right next to her was a grommet setter and the staff had grommets people could use, and she said, “I had no idea what that thing was!” I asked what she would do to figure out how to use the grommet setter, and she looked apprehensive. She said, “I don’t want to bother the staff, but this thing looks really complicated.”

Jenna saw her looking at the grommet setter and came over. She asked if Layla wanted to set grommets. Jenna put in the first one. Then she stepped back for Layla to set the next one, but Layla was putting the grommet in upside down. Jenna brushed her hands away and fixed it. “Like this,” she said. And then she proceeded to set the other three grommets. Layla tried to place her hands on the banner once, then just stepped back and watched.

Afterward, I asked Layla about the grommets, and she said, “I wanted to figure it out. I couldn’t quite see what she was doing there.” I asked her about the possibility of failing to set one correctly and potentially wrecking her banner. She said she would accept that, because she would have gotten it right the next time, and: “This banner looks so good, no one will notice a bad grommet anyway.”



Figure 13 Jenna takes over the grommet setting process.

When I later asked Jenna about setting the grommets for Layla, she said, “I didn’t want to see her banner get ruined.” I pressed her a bit about whether she saw value in failure during the learning process and she agreed, with some caveats: “Most people come in here to get a product, not to learn how to set grommets. I feel I have a responsibility to make sure everything comes out ok in the end.” Jenna had been thoughtful and helpful, but also controlling, and decided the appropriate contingency was a “successful” banner, even though Layla might have felt otherwise. Jenna wanted to help, and wanted the people she served to feel happy and successful, even if that meant taking over.

I Made It Myself!

At the brewery outreach event, smiling library staff encouraged children to come and solder LED lighted badges. I watched as each staffer took over the soldering process, holding the soldering irons in their own hands, positioning the LED lights and battery holders, then handing the child a finished product. After a while, Jenna asked me to assist in the soldering, as I had taught classes on how to solder these badges in the past. The reason the library staff were doing the soldering soon became clear:

The soldering irons weren’t working well. The tips weren’t tinned and were so oxidized as to be impossible to clean and tin. The heat was not conveying well at all—I could hold solder to the tip for 20 seconds or longer before it began to melt,

even though the stations were blasting at 850 degrees. Also, the solder they were using was lead-free, which requires a higher temp to melt....It frustrated me because I knew 3 times as many people could be soldering, if the irons were working more efficiently.
(fieldnotes 5/7)

Only one makerspace staffer, Liam, allowed children to hold the soldering iron themselves.

I listened as Liam helped a child of about age seven make a badge. He told her to be very careful because the iron was extremely hot, and demonstrated how to use it. He showed her how to always set the iron back into its holder when she was not using it. Then he patiently waited as she did the work, holding the components in place

for her at times. As other kids watched their library helpers take over their projects, this girl was able to create her own. It was slow, and involved Liam repairing a poorly soldered join, but eventually she had her badge. She beamed at her parents as she said, “I made it myself!”

My experience of this event was revelatory:

The soldering was not very good—it couldn’t get enough heat to really make a strong join. Thus the circuits were cutting in and out and the LEDs were dim. I realized that this was MY problem, but only after quite some time. By this I mean, I was agitated because I knew the soldering could be going more smoothly, but no one else seemed unhappy. My own expectations of “success” involved efficiency and smooth sailing. But everyone else just seemed happy to be there, and chat, and enjoy learning a somewhat difficult task [Only one child explicitly said HE wanted to do the soldering, not watch the librarian do it]. I was the only one who knew soldering is very quick and easy, so their expectations that it would be hard were met. A couple of my solderers mentioned they never thought they could do something so hard. I answered, “Normally it’s much easier, when the equipment works” but they seemed perfectly happy with how it WAS going. (fieldnotes 5/7)

Throughout my stay at this library, I saw staff make the sorts of assumptions I had made about soldering, regarding what “success” looked like. They enacted assumptions about who needed help and who needed “taking over.” I saw staff repeatedly take over for Rose, for example. The young, largely white staff took control even though she appeared perfectly competent and was a



Figure 14 Liam assists a young maker in learning to solder.

regular user of the tools in Productive Library.

However, 30-something white male user Victor said the staff did NOT take over for him. He compared them to more overbearing teachers: “I’ve had plenty of professors that were not as good as I think [the library staff] are at instructing how to use some of the software because they just do it for you or just don’t explain it fully, so—And then you don’t end up retaining it.” Victor was allowed to change settings on the laser cutter, load it, and start his etching without any staff intervention. One afternoon I saw other an older white man change the vinyl printer paper on his own, and when I asked young staffer Ashley if Roderick were allowed to change the vinyl. She paused, then said, “I don’t know, actually. I just went with what he said because he seemed pretty confident that he was allowed to.”

She Would Need Three Times as Much Staff.

Staff help was not always available, even when the users needed such help. Users had to know to ask for it—and not too much. Several of the staffers there mentioned waiting for someone to ask for something, while users described their resistance or unease with asking for help (Parker, Brent, Beth). Other staff members were helpful and proactive, such as Aaron, who repeatedly offered ideas and assistance for the one homeschooling family that attended a homeschooling event. Some staff helped by offering information on workarounds to the rules, ideas about projects, or other information that was not apparent to users. Nick, Aaron, and Adam were lauded by several users as being particularly helpful in these ways, which took a great deal of staff time—which the staff often felt they had little of.

Some users struggled with being “taken over” by some staff members who helped *too* proactively. Rose struggled with finding the right balance of help versus control. I saw what Rose meant when she was etching her final plaque. She was making etched plaques with an aphorism on it: “When the world says, “Give up,” Hope whispers, “Try it one more time.” Rose carefully aligned the wood on the etching bed, adjusted the height as Jenna had shown her, and was ready with her finger on the mouse ready to click the start button on the computer when she called

Jenna over for final approval.

Jenna then redid all of this work, although Rose told her she had done it. Rose looked at me with a flat expression as Jenna realigned things and made some microscopic adjustment to the height of the laser. From what I can tell, Jenna changed nothing—Rose had done the job right. Then Jenna came over and took the mouse and pressed the Start button on the computer. Rose looked at me like, “See?!” shook her head, and rolled her eyes. To me this felt ironic, because of the hopeful message on Rose’s plaque seemed to echo her hope that someday she would be seen as competent to use the equipment. In my interpretation of those gestures, I think that Rose hoped, she would one day be *seen* as an agent capable of acting on her own behalf. In the meantime, Rose *was* that agent; she did as much as she could while subject to the shifting sands of the library’s policies and practices.

Rose was a person who enjoyed making things better for her community. She had recently asked librarians in a local branch if she could set up a Coloring Club and button making events. When those were successful, she moved to another branch and started a Coloring Club there as well. She was interested in meeting with people and creating with them in her neighborhood, but not at the downtown library where I met her. When Rose spoke about her volunteer work, she was describing her own agency and power to make things happen. She was also describing a path for expert users to help others while building a community in the creative place: volunteering. Volunteers from the community could fill in the gaps in the staff’s availability or knowledge and teach either one on one, or in workshops. This was an obvious answer to Jenna’s staffing problem.

Jenna knew that she was serving largely affluent, educated, white people who often already knew how to use the tools. She liked it that way on one hand, because she said she knew she didn’t have the staff time to train people all the time... But she also said she knew that the space had been intended in part to support lower-income people, particularly people of color, in building 21st century skills. She said that she would need three times as much staff to be able to even begin to do that, and moreover people don’t come to programs, so she couldn’t train several people at the same time. Because she believed people would never come to programs, she

felt there would always need to be one-on-one training and she seemed exhausted at the thought of it, with lots of sighs and “unfortunatels.” (fieldnotes 5/24)

Yet Jenna seemed ambivalent about instituting any volunteer effort. She noted the enormous barrier of background checks required by the library. In addition, she believed few people were interested in volunteering. Rose was able to “volunteer” by requesting events and assisting the librarians in running those events in branch libraries, but this was not allowed in the downtown library. She did not need to undergo the expensive background checks to do her work in the branch libraries.

When I asked photographer Marla what equipment she wished were in the space, she became animated at the possibility of a darkroom, perhaps similar to the recording booth. I asked if she would request the booth, but she demurred. When I asked why not, she said, “I don’t think [the library staff] would listen to me” (fieldnotes 5/19). She was happy and grateful to be able to use the equipment in the space, but had no expectations that she could make requests, offer her expertise in any sort of volunteering or teaching capacity, or have any sort of meetup in the space. Despite her shows in New York City and her skills and talent she felt unqualified to help others, or to create a community of practice formally (as a volunteer), or informally (with friends).

Productive Library Conclusion

Productive Library had few written policies determining who could use the space and how. Instead, they had rules and procedures of staff control. Staff controlled access to most of the equipment. In addition, techniques of control were enacted by machines: scheduling, turning off, locking down. Information was withheld from patrons on how to extend equipment reservations, or book two machines in one day—unless the patron knew to ask and the staff member was inclined to answer.

Users occupied a dual role. They were the recipients of library decision making and the objects of library power enactments. At the same time, they were the agents in charge of their own learning and making—but could not enrich the makerspace by offering their expertise in

any structured capacity. The users were not valued resources. The institutional values favoring individual learning constrained the community and social making seen in other cases. This was a makerspace distilled down to tools and skills. “I can do all these things,” said Sean, a former member of a private cooperative makerspace. He swept his arm around, gesturing from the 3D printers to the laser etcher. “But here, other than it being free, I’m not sure why I would...it’s a little lonely. I go to makerspaces to make with friends, not just to make, you know?””

Responsive Library

The upper Midwestern “Responsive Library” is the main library in a small city an hour’s drive from a major urban center. In some regards, this small city, as with the town of the Welcoming Library, is a commuter community orbiting a larger urban center. However, it is surrounded in a rural farming environment and multiple small towns, many of which have fewer than 2,000 people residing in them. At the same time, the city feels more suburban than either a city or a rural hub, with sprawling business districts, and wide-lawned residential areas. It spreads over 20 miles around the end of a large lake. Some of the major industries in the area include a major boat-building company, a cheesemaking factory, and some other steel-based industries. The town has several small college and university campuses, including a 2-year campus of the state university system (Wikipedia, 2022; Davis, 2002).

Several local informants about the community stated that the community was working class, but that it had a burgeoning art and technology “scene” with businesses such as coffee shops, breweries, and art galleries (e.g. Roger, Erika). According to 2015 Census data, 90.5% of the 43,000 people who live in “Responsive” are white, 2.5% are African-American, and 6.5% are Latinx. The median household income is \$46,500, and 13.5% of the residents live in poverty. After the fur traders left and white settlers forced the indigenous peoples to leave, the population that settled the City of “Responsive” was largely English, German, Dutch, and Scottish. It was incorporated in 1847 (Wikipedia, 2022; Davis, 2002).

My home is forty-five minutes away from this community, and I have a long-term

knowledge of it, though little direct experience before this study. In my experience as a local librarian and library user, I know that this library draws users from towns within an hour's drive of the city of "Responsive." Residents of nearby tiny rural towns sometimes use this library as a resource center. The library is often busy, with people moving throughout the three floors that comprise the building. There is an art gallery featuring a rotating collection of local works. Downstairs, the many program rooms, such as the storytime space, and various community rooms are often packed to the gills with people enjoying local history events, club meetings, craft and other programs; over 18,500 people attended programs here in 2016. The makerspace is also located on the lower floor. The room is glass-walled, and is the first thing most people see when they venture downstairs. It was open in the afternoons and on a second and fourth Saturdays each month. It was always staffed by one, and usually two, people.

Unlike the other two cases, where I was staying with friends or family during my research, here I had the luxury of observing the development of the brand-new makerspace from the ground up. I had been an occasional observer of the Advisory Council on developing the makerspace for two years before this study, attending five meetings. These began in March of 2014. I also attended two meetings just before the grand opening of the space. I began spending participant-observer time in the space on the day of its grand opening on July 23, through early October, 2016. The lengthier span of study was due to my own availability, and the limited hours the makerspace was open each day. I spent 131.5 hours in this library's creative place, and doing interviews with local stakeholders. Over that time, I interviewed and observed 27 people, with 22 semi-structured interviews and five that were more informal. I spoke with 10 staff members and trustees, 15 users, 4 non-users and 6 minors. Some of these participants overlap in these roles.

The key participants in the case are: Justin (white, mid 30s), the person in charge of the creative place as well all of the library's technology; Richard (white, late 40s), the library director; Olivia (white, mid 30s) was a sociology professor at the local state university, a member of the Advisory Council, and when the space opened she became the main staff member working in the space. Erika (white, 50s) was an artist and library board trustee and her partner, Alan (white,

50s), was a city council member. The key user and non-user participants are: Claire, a 10-year-old Asian American creator; Chloe, a white teen maker; Fred (50s), a white minister and user of the space; Jack, a 13-year-old white homeschooler and regular user; Logan (18, white) and Xavier (19, African-American) non-user musicians; Roger (50s) and Wyatt (50s), both white, are makers and Advisory Board members for the space.

In (and Outside) the Responsive Library

I was sitting in a local diner having lunch, when I noticed the two teens in the booth behind me. One Black boy and one white, heads bent together, stared at a laptop screen as they shoveled fries into their mouths. They were talking about music production, when the bass should drop, whether they should speed up or slow down the beats per second in the bridge.

I do not normally accost people to talk to them about my research. Even when I need to interview people, it is hard to insert myself into their conversations. But these kids seemed nice, and they smiled back when I smiled at them. I asked what they were recording. They seemed happy to tell me all about it—hip hop with some beats their friend had come up with. Logan did most of the production and sampling and played bass, Xavier did the rapping and knew how to play trumpet, though they were not sure they would include horns in their music. They hoped a female friend of theirs would record some backing vocals.

Still sitting in my own booth, my body twisted around to chat with them, I asked them if they were going to record at the library. They had no idea what I was talking about. I told them the library had a free semi-professional recording studio they could use. I thought Xavier's eyebrows would jump off of his head, he raised them so high.

They asked me what the space was, exactly. I told them it's a free space filled with shared tools for people to make things, separately or collaboratively. I told them they have all kinds of stuff in them, from laser cutters to sewing machines, recording equipment, art materials, and that people sometimes teach each other or share their work there. This blew their minds, evidently. Xavier kept saying, "No way," and "That can't be right." Logan seemed puzzled and astonished. As I listed some of the equipment, they kept looking at each other, like 'what??' When I said it was all free, they seemed excited at first. (field notes, 8/8)

Their bodies started wriggling in the booth, heads nodding, almost dancing. They seemed electrified by the knowledge that they could freely access professional tools to make their music. But something in Xavier's face dropped after a moment, and he stilled. He looked at Logan and said, "No, man, they're never going to let us do our thing there. We are cussing all the time. Those librarians are gonna kick us out." Logan winced and nodded like he believed that too.

I responded that the librarians probably did not care about language, and could not hear what was being said in any case. I explained that the room was mostly soundproofed. For a moment, the two boys seemed reassured. Logan said, "I guess libraries are cooler than I thought." Then he paused and donned a skeptical sneer. "Nah, they are going to be all like teaching me stuff, and I just want to do this all on my own." When I asked him what he meant, he said that the teachers (his term) would want to tell him how to do things, instead of letting him figure stuff out in the way he preferred. "They always do that," he said.

I mentioned that the general impression that I got was that the staff helped only when people asked for help, but that perhaps their impressions would be different. After all, I was an adult, and in a professional relationship with the library workers. And while I had not seen the sorts of dismissive or controlling attitudes these boys worried about, I did not know what their experience would be like, nor did I want to tell them how to think. I thought they might benefit from using the library and the equipment, though, so I soldiered forward.

"It seems like you know how to use that DAW [digital audio workstation] well," I said. "Which one are you using?" They were using a pirated version of Ableton with a lot of pirated sound libraries and plug-ins. Neither of them had much money. Xavier had a job at a fast-food place, but Logan just had his allowance and whatever birthday money he lucked into. They had figured out how to acquire a version of the software they needed, but were just learning how to use it, in their opinion. As I stood and looked at the screen and listened to the looped high-hats and bass line, I thought they were already getting the hang of it. I said that the library had GarageBand, but were talking about getting ProTools or other advanced software. But the library did have good microphones, and other equipment for when they got their friend to record the

vocals.

Logan said, “I would totally love to record music [using the advanced equipment], but how do you even do that?...I don’t even know how to find out how to find out.” I said the library staff could likely help with the basics, and that the library director, Richard, was a former professional musician who taught workshops in the studio. Logan then pivoted, perhaps worried about being “taught,” and said he would be able to learn on his own, maybe with some YouTube videos.

I was excited to talk to Xavier and Logan further after they came into the library and used the tools. They seemed interested, but wary. While they were happy to talk to me, I sensed they were less sure about the library. I left after our short talk, hoping to see these creators in the makerspace soon. Over the course of the next couple of months, I asked library staff members to look for them and let me know if they showed up, so I could interview them and find out if their expectations were different from the reality of their experiences. But as far as I know they never came into the library.

Toddler’s Choices.

Long before Responsive Library opened its makerspace, it built a community-based council of makers to advise the library on the types of making, policies, equipment, and activities that would be most valuable and equitable. This advisory board met for three years, while the library acted both on its recommendations, and on library staffers’ ideas, and grant possibilities, to start building a collection of tools.

When Responsive Library created the advisory board from community members, it was from members they identified as stakeholders in the process, not from the community at large, or from people self-identified as stakeholders. The group was invitation-only. Justin and Richard both spoke to this issue, stating that they wanted a working group, and that an open group can sometimes get bogged down in details that do not further the project of developing a new service. While the library administration felt they were trusting the advisory committee to make key

decisions, some members of the committee (Roger, Wyatt) felt as if they could not make substantive decisions in the committee environment. Wyatt said the library offered the committee “toddler’s choices”:

You know, you give your toddler 3 choices for supper? You give the toddler the illusion of choice but you have already said that these 3 things are fine...I understand that we were simply an advisory council, that’s how it is. We advised the library council on various things and the library council every now and again would throw us a bone and say “Yes go ahead and choose one of these 5 things” ... So I felt a little cheated, I won’t lie...[it felt] a little, a little, a little condescending. Like the adults, they’re at the library committee and they’re the ones making the true decisions, and then: ‘Well do we want the red panel or the blue panel?’ and “We’ll let the advisory council decide that”... the [makerspace] advisory council seemed billed to us more as a direct involvement type of thing, where we were going to be making hard concrete nuts and bolts decisions... it really sunk in like, alright well, you’re dictating to us at this point.

Roger concurred with this, but felt differently about it. He never felt that he or the advisory board were involved in any real decision making about the space’s direction. But when asked if he would want more say about what occurs in the space, he said, “I’m pretty happy with it as is. They have done a great job choosing appropriate tools and resources that are appropriate to the space.”

Accessibility to All These Amazing Things.

As I walked through the Responsive Library, I saw hexagon shaped stickers, signs, and display units. The six-sided marketing materials acted as a signal that there was a makerspace, where it was, and what it was. These beehive-like displays reinforced the visual recognition of the space. As I walked back into the library and went down the stairs I was greeted by several signs with this hexagon motif, leading me toward a large display of materials that might be used in the makerspace: wood, fabric, leather, Lego, paper, circuitboard, and so on. The library framed its space, literally, with a suggestion of bee-like industry and creation with this honeycomb of materials.

When library director Richard described the creative place, he linked it to a local STEM-based charter school, and the economic development of the area. He also stressed music and the arts. He spoke of the huge variety of materials and projects that the space could accommodate. And people using the Responsive Library noted this variety even before the makerspace opened, saying:



Figure 15: Responsive Library's hexagon motif incorporates materials that might be created or used in the creative place.

I can't wait to start cutting my planner sticker designs out and making so many amazing things. You can even bind your own books!!!!!! I have been dreaming of being able to do all of these things. And I'm not much of a technical person or technology type stuff. But after looking into the things that the 3D scanner and 3D printer and all the things that you can create with the cad laser and engravings...thank you [library makerspace] for having the accessibility to all these amazing things, right here in Lil old [city]. (public review on Facebook, 11/10/2016)

Some users were exposed to the possibilities in the space by other users. Jack, Dylan, and Claire, all young users of Responsive Library, found out about the spaces through family and friends or by seeing the space as they walked through the library. Whenever I entered the makerspace in this library, there were usually one to five young teens bent over 3D printers, sewing machines, and artistic endeavors.

One day I asked Chloe, a white girl about age 15, how she learned about the makerspace:

I was actually one of the first people to find out about it because my friend B who hangs out here a lot... we actually met at the library and she told me like, "Oh, they're getting this [makerspace] thing." She makes clothes... and she knows how to use a sewing machine, but she doesn't have one. So she was like super excited about the sewing machine...I was like, "Oh my gosh I make clothes too. I want to use the sewing machine. I don't even know how to use a sewing machine...and so we like start talking ... then I found out they were doing classes before the

opening and I just kind of you know, fell in.... That's an awesome way to find out though, right? And immediately know what you want to do and having somebody else to do it with.

Chloe discovered the space and formed relationships with makers at the same moment of exposure. Others I interviewed had similar experiences, many of the people making friends in the classes and “badging” sessions—structured workshops offered to ensure people know how to use the tools. One reason Responsive Library’s space was constantly in use, perhaps, was due to this rigorous schedule of programs. It may also have been due to the staff’s actively welcoming attitude.



Figure 16 This library offered a rotating exhibit of the art made in the space, as well as a formal art gallery on the first floor. This is the “rolo” art made from rolodex cards.

Is There an Intro Experience?

As Chloe worked on her rolodex card-based collage, I realized that the offering of easy drop-in activities such as collage, stamping, rock painting, jewelry-making, and other activities also drew people into the space and together into conversation. Many days a few people would gather to sample these activities as they chatted. But people who did not identify as crafty or artistic sometimes struggled with ideas of what to make, even as they admired the space and its potential. One user of the Responsive Library space, an older minister named Fred, identified some problem of exposure, and offered a solution:

Maybe the hook is the question of, “What do I want to do?” Is there an intro experience of creating something where it allows people to see what might be possible or, “I never knew I could make an iPhone case” or whatever, you know... not just the imagination of what I could create, but imagining that I could be participating in a process where I could think of something.

Thinking of something to make challenged many participants in this study. But not Fred. He was working in the “loud” room of the makerspace, a glass-doored space that housed the CNC mill and laser cutter, as well as large tables, and later a small printing press. He was making wood-inlaid coasters with elaborate Celtic crosses. As we spoke, the

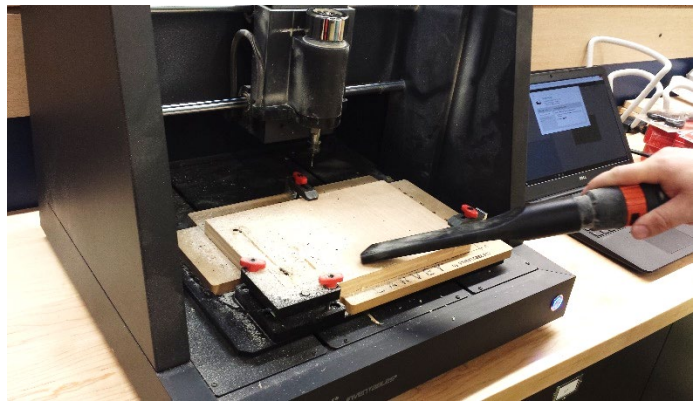


Figure 17 Users vacuumed off their messes after using the CNC milling machine.

loud CNC mill was routing out the crosses. Periodically he would pause in speaking to me, hunch over the machine and vacuum out some of the excess wood shavings, or to ensure that the router bit was not taking a wrong path. He might have been unaware that these intro experiences, as he described them were being held on a near-daily basis in that space, which was an issue of exposure in itself. The many signs, schedules, and activities held in that library were not always enough to register pertinent clues in users’ minds. Behind Fred, I could see four posters within ten feet of him advertising workshops in the space—all sorts of intro experiences to help expose the utility of the space to different types of makers: carving, music-making, 3D printing (fieldnotes 9/2).

At Least I Know How to Do It.

In the late summer I entered the library to find Tyler, age 10, hard at work with his father, George. Tyler was coding the Little Bits in the cloud-based app, using a laptop. As I laid out my sewing project for the day, I listened to their conversation. Tyler was getting mixed results using the interface, and mentioned to me that he had more luck using the mobile app. Still, this interface was helpful, he said. When Tyler plugged his Little Bits combination into the computer, it told him which bit is missing, so George told him to get another: the “one that goes wooo” and shook his hand back and forth.

“Oh, you mean an oscillator,” Tyler rejoined. After a few minutes of poking and prodding, the machine appeared to work.

“He’s like a kid in a candy store,” George told me. Then he said to Tyler, “I can’t believe you actually you that going, you crazy kid!” He reached out his hand to steady a vibrating bit.

“Wait wait...don’t tamper with it,” exclaimed Tyler. His dad pulled his hand away hastily. After a few minutes, I heard Tyler say, ““OK, can you help me understand this?” He wiggled the ‘button’ bit to ensure it was connected properly. The machine had stopped working. Tyler and George conferred.

“Oh, the wifi just went down,” George said, as he looked at the computer. But that did not appear to be the problem.

Tyler wailed, “Oh no, I just lost it! I just lost everything...just because I touched one circuit I lost everything...but at least I know how to do it. Press connect...”

The project I was working on was far less interesting than theirs, so I got up to ask them what they were doing. George said he was printing a model of a stealth bomber, but that Tyler wanted to try something else. “Tyler took over my computer,” George smiled.

As I spoke with George, Tyler continued wiggling connections and swapping bits. He pointed to the computer, “You can tell when it’s connected. There’s my circuit, I named it Tyler, my name. When it’s green solid [he pointed to the interface], it’s all connected but right now it’s messed up.”

I asked him how he knows all this stuff. “I just do,” he said.

“But did you read it, or watch it happen?” I asked.

“I saw it happen,” he answered. I wanted to pursue this further to find out where he saw it, but he was not interested in talking to me, he was busy making. Instead, he told his dad, “Hook this thing up so it’s still operational.” His dad tried to help, but Tyler was frustrated. “Why is this [small light] red? I’ve never ever seen it turn red, what does that mean?”

George shrugged, “I don’t know.” He turned to me and said, “The thing I like about the Little Bits is that you can’t mess it up—I tried to connect them the wrong way and the way the

magnets are configured it won't let you."

"So you can't short the circuit if you try?" I asked.

"Right, it's safe."

Tyler was not interested in our conversation. He interrupted. "Here's an SD card," he waved a small square he took from one of the Little Bits.

George frowned, "Don't mess with it."

"Why?"

"Because it's probably got information on it." George and Tyler hunched over the computer, poking at the collection of Bits. Tyler kept moving the table on its casters—I asked if he wanted me to stop the rolling, unless he liked it to move. He said he wanted it to be stable. I showed him the locks on the casters, and we locked them all. I moved onto my serging project for a while, then returned to see how these two were getting on.

Tyler said he was working on a new setup, plugging the Little Bits into the computer, even though "they don't suggest this." He scowled when he found some new trouble with computer app. It was seeing his new project, but it looked like it had lost his last project. Tyler sighed, squirmed, made funny cheeping noises, and generally acted like a ten-year-old child. But he spoke like a scientist or an engineer (field notes 8/1).

That's Six Hours Well Spent.

If asked, many stakeholders in public libraries say that the makerspaces, tools, and opportunities they offer are for kids like Tyler to learn the things that he was learning in this story. These are STEM (or sometimes STEAM, including Art) environments for children and people who need better job skills to learn, and for innovative prototyping activities to occur. However, in Responsive Library, Frank carved coasters as gifts, Chloe sewed a quilt for her grandmother, and friends hung out around the community art project tables, making collages to share. Much of the creation in this space centered on art and gift-giving.

Nevertheless, when asked, many users of the space responded that the reason for this

space was to educate people in STEM, even if it was not going to be the hotbed of entrepreneurship that they anticipated. City Council member Alan noted:

I think a lot of people and myself included, thought this is like... okay this will be something where somebody could come up with an idea and make a 3D model of it and do prototype of it and learn how to do that and then maybe you can take that to a manufacturer and build a part for it or something like that and thinking that that was maybe the main purpose of it... but really, it isn't. I mean that's one possibility there, but really it's about getting people exposed to these ideas or these creative outlets and allowing people to imagine the possibilities.

One could see that exposure and imagination taking root in the young users in particular: Jack, Mason, Dylan, Chloe. Each were trying on various types of making to see what fit them best.

Olivia, the staff member responsible for the day to day operations of the space, beamed at all the people making, whether it was 3D printing, collage, robotics, jewelry. She did not differentiate between the forms of making or rank their importance. When she described cool projects made in the space since I was last there, she was as likely to describe a cardboard art piece as something made with the CNC mill. Still, some people expressed judgements about the “appropriate” uses of the tools. Jack, age 13, identified two types of makers, one with more “legitimate” aims than the other:

Some people like a Poké Ball or Pikachu or something like that and other people like print something like to make their lives easier. Like there are two different people. One that prints some fun, one that prints something for like a... for a practical use. ... I mean like that blue 3D printed thing with that roll of painter's tape on it [points to a 3D printed tape-dispenser]. I mean that's a really good use... That's obviously a very very good use of filament. I mean they said that took like six hours, but that's six hours well spent... I mean if you print like a figurine from a game, I mean obviously that's okay. I'm not like yanking on people saying that they printed it for a weird use, but like I mean... I've printed stuff like... sometimes it's just cool... I'm not saying like it would be bad to print like a Call of Duty figure ... I mean that's not a bad thing.

He identified useful objects as a preferred use of resources, even though he thought all printing was valuable. In this library few makers linked the value of their own making to their economic or practical gain. Uplift, learning, fun, and expression all aligned in the culture of this space.

Fun Shouldn't Need to Be Justified.

In the early fall, the library held a program during a city-wide festival. Justin asked if I would be willing to lead a simple craft workshop and we decided to do Shrinky Dinks, which involve drawing on plastic, cutting it out, and baking it so that it becomes much smaller and more durable. People could make buttons or key chains or jewelry. This was a fun, lighthearted drop-in event. No registration was required, unlike many of the programs.

Families streamed into the creative place, greeting their friends with shouts of laughter. They gathered around the tables, traced patterns or created their own, colored them with sharpies, and cut out the shapes from the plastic sheets. Then we baked them to shrink the plastic, and people had items to take home with them. I looked at all the people sharing their objects, showing how the colors ended up (darker colors turned black when shrunk, we found). They were having fun, admiring each others' work.

As I looked around at the happy families creating simple plastic items, I was struck by a revelation: The kinds of makers in this space that I had observed for months involved two different audiences. Independent creators would spend hours learning a skill, riding a steep learning curve, using the tools, community, and space to build their projects and knowledge all in a self-motivated, self-directed way. I had seen that behavior with Tyler, Jack, Mason, Chloe, Roger, Fred, and many others. These were the people that makerspaces were developed to serve. But during programs the library saw more casual makers. These were people who enjoyed coming into make a pre-selected project, often as a social activity to share with friends and family, and who might never pursue the art or craft further, develop deeper skills, or be interested in at-will project generation. I saw many faces in the crowd that I recognized, but it dawned at me that I recognized them from other programs, workshops, and planned project events. The two families laughing at the table as they created keychains were the same families I had seen making rolodex collages and at the grand opening event, making jewelry from electronic components.

Olivia and Justin had already started differentiating these types of makers. She talked about the "crafternoon" events, structured and predetermined making programs. The

participants in these events may enjoy learning a new skill or craft, but mostly, she said, “They come with their friends and they want to sit down and do a craft and take something home.” This was the activity I was seeing swirling around me that afternoon.

Some stakeholders in this space made the distinction visible and described the playful experience of coloring plastic as a pathway to some educational goal:

Even if they just come for Shrinky Dinks which... yeah, there's not a whole lot of life skills that come from that. I mean there's art there and that's great in itself, but the fact that they're in this facility and seeing that, hey there's a 3D printer going on over there, in operation over there. There's a CNC cutter over here and a laser cutter and a recording studio... That kind of gets people thinking and they think to the possibilities of what they can learn and that's really what this is about, I think. It's just giving people the opportunity to experiment and learn and grow (Alan, the city council member and husband to artist and library trustee Erika).

Alan saw the space as “really about” learning, or uplift. But Justin saw the need to play, to have casual leisure experiences that were purely fun, as less instrumental for “real” uplift and skill building, though that was a valuable and integral part of any crafting. He had been thinking about this for a while, in fact. In his blog well before the makerspace even opened, he had said,

We are awash in evidence of the importance of play for learning and have been for years. Yet, I think that the reason we play in the first place—not the reasons we *should* play or use to justify play, but the reason we *do* play—sometimes gets lost. We play because it's fun. So, fun is of the utmost importance for creativity and learning (for kids *and adults*) and we shouldn't feel embarrassed about designing spaces, programs, and services for fun first. Fun shouldn't need to be justified. (J.C., 2016)

This library balanced the desire to ensure people could have fun and share the joy of making, in and of itself, with the desire to facilitate uplift through the development of skills and products, and through fun.

I Was Kind of Mad About That.

One day, Mason came into the makerspace, strode up to a 3D printer, and canceled a print Jack was about to begin:

I was changing the filament, but then he canceled it. And then he changed it back to red. So that... I was kind of mad about that because I was just about ready to put everything on and stuff. I mean I had the print on there. I previewed it, made sure it was right. I was like right on the edge of printing. (Jack)

Some conflicts arose regarding sharing, the use of the space as a community, and the use of the space as an individual. Laissez-faire attitudes to others' projects was rare, however. Generally, people took care to inquire if a machine was in use before they began using it. Nevertheless, occasional tensions arose between the need of an individual for a tool, versus the needs of the entire community, or another person. At the same time, people were forming interpersonal attachments and communities within the space.

I saw these attachments and conflicts first-hand during the Shrinky Dink event. As I prepared the materials for the workshop, a few dozen people streamed in and out of the creative place kitchen, where the oven was for shrinking the plastic. They asked me to let them help set up markers and scissors, and began working on their creations. There were families with children, older adults, and teens; Erika and Alan were there, as well as Roger's family, Chloe and her mother, and many more I had met already.

I helped people find patterns to trace and discussed color combinations, but my "leader" status was nominal. I was mostly present to ensure people got what they needed from the experience. As I lifted my head from assisting a developmentally disabled man with the scissors, I saw Chloe helping a younger child choose colors, while Dylan and his mother worked with another family that they knew. When new people arrived, they shifted to make room at a table and welcomed them. Soon the entire makerspace was filled with people laughing, making art, and helping one another.

The line at the oven started to back up. I was in charge of placing items in there and timing the bake. People sometimes needed to leave swiftly, and others would gladly give up their turn in the baking queue. People shared markers, crossing the room to hand a coveted color to the person who wanted it. When scissors ran low, people formed ad hoc processes for sharing them: "I'll cut this part, then you can do your outline, ok?" Throughout the event the desire to

be good to one another was palpable. No one was ill-humored or rushed.

Giving Away the Power.

Later, Roger described how his individual role in the space could impact the communal experience:

I'm responsible for being present at some level. I'm responsible for taking advantage of the wonderful space and for the tools that they have gathered. I was part of the community that expressed a desire for such a space and now I need to engage it so that it can continue to be a success.

Participants in this study regularly touched on the sort of community-spirit they saw in the creative place, and how they wanted to step up to take care of it. For example, Olivia described finding her tribe of people in the making community in this small city, and how it led her to working in the makerspace. She described a sense of recognition and relief when she found her “people” in the making community. Artist and trustee Erika described the culture of art she wished to continue to build, with her work curating the art gallery on the library's first floor, as well as her work teaching, learning, sharing, playing and making in the makerspace.

Many people in this library described building relationships through making. This relationship building was not only welcome in terms of community building and feeling a sense of belonging, but was instrumental for the making process itself. As Jack noted:

Sometimes you look at stuff and you don't really know what it does at first. And then like you find out and then you're like, “Oh that's actually a way better use.” Like you could just sit there and looking at it like, “I've no idea what that is.” And then like the person, if they're kind enough to tell you what it does, then obviously they're going to be like—they tell you what it does and sometimes it can be something incredibly cool.

This sort of relationship building, and sense of possibility through interpersonal connections was highly regarded by many of the people who participated in this study (Olivia, Chloe, Dylan, Jack, Erika, Roger, and so on).

In the best example of such relationship building, the advisory council for the makerspace in Responsive Library took three years to build consensus on what the space would be like. The

slow development took place as the library gathered the funds and funding partners to ensure the vision could be articulated fully. The users noticed the focus the Responsive Library invested in ensuring the space and its policies were user-centered and socially oriented. For example, minister Fred talked about community members helping one another learn/use the space, “There's a reciprocity in what's going on. Which is ... giving away the power. How do you bring someone else up in the process?”²⁵ Fred’s idea that power was being shared was the point of the space’s design and practices. He was right; technology director Justin and library director Richard, the ultimate creators of the space, both described wanting users to be in the driver’s seat in steering its course.

There Is a Certain Structure and Rigidity to the Library.

Some of the barriers to access in these makerspaces was due to the community members’ obliviousness—I had seen that in all three libraries, as workers struggled to communicate, display, market, and be heard over the clamor of everything else that captures people’s attention. In this library, the staff tried to eradicate some sociocultural and intellectual barriers to access. Staff stood behind standing desks or balanced laptops atop shelving units, ready to leap up and offer tours to any interested-seeming passersby. Heaps of projects decorated the slat walls of the space, next to the tools used to make them, and often accompanied by a poster advertising a how-to workshop. Many signs, staff members, and classes oriented the user about the location of the space, the rules of the space, and the tools available. Every tour involved a lot of explaining of what the space was for and why it existed, and moreover, what each person could do there, personalized to their interests.

As I walked down those stairs one day, I looked through the glass wall into the space. There was Mason, who said he was 13, but we all had our doubts. Library rules said children needed to be 13 to use the library without an adult caretaker. Both Justin and Olivia mentioned at a few points that they resisted looking at Mason’s library record to check his age—they wanted to

²⁵ This was one of the very few actual uses of the word “power” in relation to the activities in the space that one of the users of the makerspaces articulated.

keep him in the space. He had been in the space nearly every day in the summer, and now he was adding new filament to the 3D printer. His hands knew what to do. He was turning his head over his shoulder and chattering at Olivia, who leaned against the standing desk/lectern, where she sometimes had time to work on marketing materials or workshop planning. His hands kept feeding filament into the machine without a pause.

At a table nearby, Jack was kicking his feet against the stool he sat on, as he fussed with some Little Bits. These are LEGO-like toys that connect magnetically, each with a different circuit board and either a sensor or other input, or some output mechanism. A temperature sensor can be connected to a fan, for example, or an alarm. Jack was building a synthesizer with a sequencer and oscillator. It made fun swooping noises when he twisted the oscillator knobs. Jack was a young homeschooled teen who had learned about the makerspace from Mason. Jack had tried to build a synth earlier in the summer, but it had not worked well. Now he sat and watched a YouTube video on the library's laptop, and it walked him through the steps.

Justin was perched on a stool at the shelving unit, typing on his laptop, looking out over the space. Unlike Olivia, he was more casual about popping up to give tours. He was a laid-back foil to Olivia's more exuberant personality, though both were friendly and good listeners whenever someone came up with a problem or a question.

I sat at a table near Justin, and we chatted about a new rule in the space. It forbade the use of more than one tool at a time, in hopes of ensuring more access when people walked into the space. He repeated something he had said before, about being reluctant to make rules before they were necessary, but it had become clear that this rule would ease the pressure on the 3D printers and the recording studio. Justin said, "if you're carving something and 3D printing something and somebody comes in and wants to use the 3D printer it's kind of unfair" (field notes 9/21).

I was waiting for my friend Roger and his son Dylan. We were meeting at the creative place to talk about their use of it. Roger was a long-term maker who had started a cooperative makerspace in Minneapolis, and was an avid 3D printer and artist. Dylan was twelve, and wanted to print things, but had to have his dad with him to access the space. When they arrived, we sat

and waited for a printer to become available. We discussed the new rule about one tool at a time with Justin, who Roger knew well. Roger said that it seemed reasonable—the need for such policies was clear as we waited for a printer to open up—but also that it could be a problem. “Some of these prints take a long time, and you’re not supposed to leave while it’s printing,” he said, “So what do you do while you wait?” Justin conceded the point, but also noted the many tools in the space that did not require a signup or badging, such as the art kits and Little Bits.

Roger had been on the Advisory Board. Though he rarely used the space, he was enthusiastic about it. Still, he could see many limitations in the access to tools and making opportunities, even as he understood institutional reasons why access to these tools was limited.

He said, in a later interview:

Things that [the makerspace is] missing are large, loud, messy, and possibly dangerous tools. Welders and other metalwork tools, typical woodworking tools. Really any kind of power tool, which is pretty high on the list for the reason people often go to makerspaces, because they either can’t afford or don’t have the space for such things. Everything there is very well contained and has no potential to impact anyone else in the space or in the library. Traditional makerspaces tend to be loud and sometimes very messy. For their credit however there was at least discussion about having a garage area allocated to such things. Time will tell I suppose. That’s another reason I feel obligated to support the space so that there is incentive to expand if that possibility exists. Also they don’t have much space for storage so the size and complexity of projects is fairly limited.

Roger was enthusiastic and complimentary of the space overall, but his experience in the making community offered him a different view of what a makerspace could be. He described the library’s efforts as something other than a makerspace—a place where access was uniquely possible because of the very rules and practices that made the space LESS useful for “real” makers:

There is a certain structure and rigidity to the library system in my experience that perhaps does not allow the full makerspace experience as I’ve come to know it...there are pretty obvious limits in place...a decent example is when you mentioned having inappropriate embroidery and Justin just kind of twitched,

(laugh).²⁶ There would be no second thought about such a thing in a traditional makerspace. Your inappropriate embroidery has little chance of setting anything on fire or removing the digits of a guest—is that what they call people at the library? I suppose part of it is that most makerspaces aren't really intended to be family friendly. There can be programs oriented for kids, but the assumption is that most things are adult only. That offers a certain amount of default freedom. The library seemingly works with the opposite assumption... I think keeping things family-friendly or generally inoffensive is a fairly high priority for programs especially, it is the nature of the library after all. I do think that you could create the embroideries in the space without resistance.

In fact, Roger later embarked on a project of creating items emblazoned with a four-letter word, including laser cutting a stencil in the space. When Justin saw it, he smiled slightly and shrugged. There was no barrier to using the space in this way.

An excellent example of the contradictions of access in this space involved “badging” classes. These short workshops helped to train and certify users on equipment. Before using the serger, 3D printer, laser cutter, CAD carver, or recording equipment, one had to be “badged.” However, getting into the badging classes was challenging. Often the classes were full, Roger said.

Justin mentioned that someone had told him they constantly watched the library calendar to see what programs were offered, so they could get signed up right away. Roger shook his head. He worked, and didn't have time to watch the calendar. In addition, he already had years of 3D printing experience under his belt. Ultimately, as he did with me and the laser cutter, Justin “badged” him individually outside of the required class setting. I never saw him or Olivia do that with any other people while I was there. They required everyone else to come to an official badging session. People who had spent years on the Advisory Council, or otherwise embedded in the makerspace, enjoyed special privileges.

We're Not Sure That We Could Handle That Reaction.

There were some limits to the interpersonal connections and ease with others in the

²⁶ Roger is referencing a discussion we had with Justin and Olivia in which they asked if there were any workshops either of us would like to teach, and I mentioned that I was currently making some embroidered art pieces, often including somewhat “adult” language. I suggested a subversive embroidery workshop. I ended up teaching this workshop the next spring, sans any “adult” language examples of my work. Roger taught a workshop on bullet journaling.

space. At other times, issues of unease sprang up around the types of making that could be construed as dangerous, messy, or adult in nature. When Roger worried about his 4-letter-word art and my “subversive” embroideries, and Xavier and Logan worried about swearing in their hip hop music, a certain amount of self-censorship occurred for users to feel comfortable in the space. Roger would cover up his art in front of some people to ensure they were not offended, for example, and while I was never told not to bring any embroidery with adult language to my workshop, I self-censored to ensure others did not feel a sense of unease and to promote a sense of community belonging. This library had several books with the word “fuck” or “f*ck” in the title, such as *Go the Fuck to Sleep*, so the staff had little concern about such language appearing in the library environment. Rather, library users projected their idea of decorous engagement with the space that did not precisely align with the practices in the other parts of the library.

Justin also struggled with feelings of unease vying with the need to take care of the communal experience of the space. For example, he was worried about making messes in the brand-new expensive space, but said he would never stop someone from bringing paints into the space. One issue where he struggled with ensuring people felt the space and activities in it were safe and appropriate arose from censorship:

Let's say our state senator stopped at the library, which he does occasionally. He used to be on the board, very conservative approach and he happens to walk by our giant windows and in the back somebody's almost done printing a 3D dildo. So we're not sure that we could handle that reaction. What would happen after that. We probably can't deal with that...

S: You can't?

I don't think so. I don't think so. It's beyond our ability to deal with it....And we don't have privacy screens or anything like that. Just like we don't have privacy screens for 3D printers. So the thought is the policy carries over.

S: How do you square this with intellectual freedom?

We don't. [laughter] Very frankly, I don't.

Justin struggled with ensuring the space was available to the community while potentially limiting individual uses of the space in terms of intellectual freedom—a freedom he valued and

wanted to reflect in the library's policies and practices.

We'll Figure It Out.

During one badging class I observed Olivia teach 3D printing. She had purple hair and was wearing one of her usual bright printed dresses, red shoes, and cat-eyed glasses, looking youthful and quirky—but also like the professor of sociology she was in her “day job.” She started the badging session out with an orientation of what the tool was and what it could do, then walked the eight attendees through the steps of setting up a print, leveling the printer bed, changing the filament.

Throughout, she increased all forms of access by ensuring people understood how to interact with the printer, how to create items, and what items might be useful for them. Her encouragement was constant. As one person struggled to reinsert the printer bed plate, she said “It’s super difficult, but we’ll figure it out.” Then later she told the same person, who nervously asked many questions, “You’re a pro already,” and “After the green [filament, which the user had struggled with], these are cake [steps to leveling the printer bed]” (fieldnotes 8/11).

Olivia’s brand of support and constant encouragement increased people’s intellectual access. It also meant that everyone in the space appeared comfortable asking Olivia for help, admitting they made an error, or suggesting a new idea. She was on their side, and ready to brainstorm solutions to any problems. At the same time, she was not intrusive, and left people to their own devices. But she had a good eye for spotting unease or struggles with a project, and often stopped by someone’s table and asked them if they needed anything, or she commiserated with their struggle.

As I worked on a electronics project next to Roger and his twelve-year-old son, Dylan, some loud buzzes and beeps drifted over from the toy circuits Jack was creating. The hum and chirp of 3D made robotic music. At times, the CNC mill in Responsive Library was quite noisy, but sliding glass doors muffled that noise in the rest of the space. Right now, no one was using the mill, but the main room was humming with noise and activity. As Roger went off to work on

the 3D printer, I spoke with Dylan. He was tinkering in a simple CAD program, trying to figure out how to model a design to print, and scrolling through models in the digital library Thingiverse.

As we spoke, Dylan kept flailing around in his seat, saying they were “super uncomfortable.” He said, “my butt is numb,” and he wanted a cushion. We moved to another area, away from the printers, where there were a couple of more comfortable chairs, but there were no electrical outlets or a high table for working on a laptop there—it was more for hanging out. So after a few minutes we went back to the metal stools near the printers. As he became more into looking at the models on the laptop he stopped squirming and I asked if he were more comfortable. “No,” he said, “I just didn’t notice because I’m into this.”

These stools were the bane of my fieldwork in this library. They were attractive and industrial-looking aluminum, easy to move and stack. For me, the metal was cold and hard and the lack of seat-back meant that my back always hurt when I left the space. I had seen others suffer as well. One day I came into find one of the regular adult users, George, sitting in one of the black comfortable chairs in the “hanging out” area. He had pulled it up to the working tables. A few minutes after I came in, a kid went and grabbed a black chair too. Leslie, the marketing director who sometimes worked in the space, asked him about the metal stools, “So what is it that you don’t like about those chairs guys, the cold?” George agreed, but also mentioned the lack of back support.

Leslie said she’d noticed some issues when she taught a workshop with older adults because of the chairs. I asked what would be done about it, if anything, since the metal stools are brand new and very nice. She said, “Nothing for now...these are fine for sitting in for half an hour.”

“Not for all day,” I said. “If you have back issues.”

She grimaced slightly and nodded, returned to serging. (fieldnotes 8/4)

Watching young Dylan struggle in the stool, I wondered if Leslie still felt that such short-term seating was the best option for long-term making, especially for older people.

This Isn't for You. Keep Going.

Roger spoke of the need to feel emotionally comfortable in the space as well, and how traditional makerspaces struggled with the inclusivity he saw at this library:

Like most tech endeavors the people that tend to gather in makerspaces are white men, so it can be especially hard for people that are not white men to feel comfortable integrating into those communities. The most obvious example is women. Many makerspaces have programs in place in order to reduce that barrier. But the library is familiar to everyone and while there may be a certain amount of intimidation at walking into [this makerspace] it's nothing like that of walking into a [traditional] Makerspace.

He approved of the welcoming attitude of the workers and how they actively engaged people to reduce the intimidation factor he said was pervasive in makerspaces. But when we looked around that day, there were the faces he expected to see in any makerspace: mostly male, white, and young.

Richard, the library director, saw similar issues in his library:

I think we need to do a better job of encouraging...even though you can see in and it's glass enclosed and you can see...you can observe very easily what's happening in there. I see more and more people walk by and look and there's... It's clear to me that they don't feel welcome, that there's something that is not projecting or telegraphing to them whether subconsciously or in the design that's saying, "This isn't for you. Keep going."

After a 3D printing badging session that August, Olivia escorted newly arriving people around the space and talked up the various projects and people that were enjoying the space. I could see her active response to Richard's concern about welcoming people (fieldnotes 8/11). She informed an older man that another man was building a stand for his camera so he could take better macro photos. I had heard her describe the type of music that people were making to young musicians visiting the space, and the t-shirt quilts that were being made to an older woman. While she made a few assumptions about the type of making the person would be interested in, she listened to what they said, and emphasized projects that might be familiar and comfortable to each user. She was helping them see themselves in the space.

She Would Be Comfortable Speaking Up.

This form of framing of the space and the resulting sociocultural access sometimes evolved into increasing ease in various kinds of making, as people described feeling like their sense of self, or disposition, shifted. Chloe, a shy teen in the Responsive Library space, blossomed in using it and helping others learn. She went from not feeling comfortable in speaking to people she did not know, to eagerly leading a group of older adult women in learning some sewing and crafting skills. She gained “experience being a leader... in a collaborative sense rather than a ‘I’m telling you what to do’ ... I think it allowed her to have enough familiarity where she would be comfortable speaking up” (Olivia). Chloe’s introduction to the space had been mediated by a budding friendship with another female, centered on fiber arts and crafting. Chloe intended to branch out into forms of making that were less familiar to her.

From an institutional perspective, library workers identified their own strengths and weaknesses, or dispositions, as a reason for their variable capabilities to remedy intellectual access barriers. As Olivia noted, “Sometimes I worry about people being frustrated with me not knowing everything.” She went on to discuss how her own intellectual access is facilitated by using the tools in the space:

I fail every, every day. I failed yesterday working the Silhouette, I mean...
[shrugs]... and I learned so much...it was just it was things I hadn’t done...things
I didn’t expect, and now, like, when I teach a Silhouette class I can tell people
“Well, this is what you do for this.”

Her failure was uncomfortable to her, but she embraced it and a culture of failure as a way of becoming more comfortable with different kinds of making, and as a way to empathize with new or marginalized makers.

I Feel Like I'm Being Held Back.

During the Shrinky Dink program, I sat for a while with Claire, a ten-year-old Asian American girl I had met a few times in the library. She was a talented musician and artist, and I had interesting conversations with her at the makerspace grand opening event. Today she

seemed to be happy to make plastic trinkets, but I saw her looking longingly at the CNC mill in the other room.

I knew that some users felt happy and surprised that they could use the makerspace and tools at a young age. Jack thought he would have to be at least 16, but was thrilled to be able to use the tools at 13. Other young people, such as Tyler, made the rules work with the help of accommodating parents, who would spend hours with them as they created.

As Claire colored a Shrinky Dink, she made it clear that she also loved the idea of this space. But she was offended that she could not use it on her own, without having to beg her mother to bring her, and then sit and wait for the hours of making Claire wished to do in the space. It was obvious that Claire had a great deal of crafting expertise. Her hands were deft and confident, whether she was drawing, cutting, making jewelry, or playing ukulele. This suggested this age limit was a burden on competent young makers. Yet Claire never considered petitioning for a rule change or exception:

Like for the last five times I've been here, I've said at least twice, "I wish that I was 13 so I could be badged for it."

*S: Why do you not say, "I wish that the rule was that 10-year-olds could do it?"*²⁷

Because I didn't know. I guess I never thought of it that way...

S: So you'd rather do something more with the equipment, maybe more on your own?

Yeah.

S: That you get to decide?

More independent...I feel like I'm being held back.

When I asked Claire if she could ask her mother to become trained to use the equipment and then use it with her mother, she drilled down to the real concern with that idea: "I wouldn't

²⁷ This question was not one I would normally ask, in part because I did not want to put words in the mouths of the interviewees. I asked the question about framing Claire's discontent as changing the rule instead of wishing she were older because I was curious to see if that framing felt authentic to her. She seemed a bit rebellious, unlike most of the other people I had spoken to, so I took a chance and asked a question I would not have asked most people. Overall, the interviews I did suggest that most of the users of the library had extremely low expectations of the library, and were satisfied with what they could get.

really do what I want to do, which is make sure that 10-year-olds could do it without having their parents have to go through all that badging thing if they're not interested.”

As I watched families with children work on Shrinky Dinks, I realized I regularly saw the tensions Claire was describing play out. There was a child begging his parents to come back to use the 3D printer on Monday; here was a child being dragged away from the Little Bits because his mom wanted to go home to make dinner. These children were at times objects that the space was aimed toward—funders and community members often cited children’s learning as a primary reason for makerspaces in libraries. Yet the policies of the space ensured that pre-teens could only use it when an adult made time for them to do so. This was challenging for parents who worked a lot (Tessa, George).

During the Shrinky Dink afternoon, people came up to me to ask for help. Could I help them cut their keychain out? Could I help them choose colors? Could I help them erase a mistake with rubbing alcohol and a q-tip? This was in direct contrast to most days in the creative place, where Olivia offered help to new users, but the users rarely needed or requested much. They had been “badged” and knew at least the basic workings of the machines they were using.

I've Never Like Been Like Told Like an Outright, “No.”

I recalled a conversation with Justin, which had centered on issues of help and control, and how to ensure people were in charge of their own making activities in the library. He struggled with his own inclination to relinquish control over what occurred in the space, with the library’s apparent need to maintain it. He described the emotional labor of telling people no as a burden he did not wish to carry. And, as someone who had been active in the maker community, he valued people’s freedom to make all sorts of items, including those that might raise eyebrows, such as sex toys or items emblazoned with four-letter words.

He also valued the space he was creating in Responsive Library, his co-workers, his job, and his community. Thus he was often in the untenable position of needing to enforce rules he did not entirely agree with. He described wanting to negotiate the library’s need for some control

to help people achieve their own aims:

Is it affecting a patron's user experience that we don't have copyright signs up? If it is, it's probably positive, right? Because they don't have another sign telling them what to do ... on the other hand, if somebody wants to print sex toys, does that impact their user experience negatively? It does... You know, if they were really sincere about that, I mean in our conversation about it, I think I would try to find a way to help them that is not... you know, that is compatible with our policies, right? And I think Olivia would too. So I feel like you do what you can.

He described issues like painting in his library's creative place, which was technically not prohibited, and that he would not stop someone who came in with paints. He discussed how he would like to help people who needed to print something that would take many hours to print, even though the library would be closed. In each example, he attempted to reconcile library policy with the needs of the users, but recognized that one or the other would of necessity suffer. He wanted to bend rules for people, but worried, "I know that if I start letting people do it [print overnight], it's going to get out of control and... We just don't have a better way of dealing with that right now."

Justin's desire to ensure that makers were the people in charge of their making was tempered by his awareness that not everything was possible in the shared space, *because* it was shared, and due to the library's limited resources. He wanted to keep the loosest possible hands on the reins of control over the people in the space. So, as this new makerspace developed, rules emerged from practice. Some fears over loss of control were well-founded, as issues arose over people using the recording room and equipment in messy or damaging ways.

Advisory board member and long-term maker Wyatt spoke to the need for rules to control users, "I fear that a few bad teenagers doing things that bad teenagers do are going to preclude good teenagers from being able to use the space." Yet in this space, I rarely heard any staffer tell a user "no." The users noticed this freedom and welcomed it (e.g. Fred, Jack, Noah). Chloe said,

I mean like I've been told, "We don't have this yet," or you know, "It's not..." or like, "You have to be badged first." But I've never been told like, "You can't try it."

Like I've never like been like told like an outright, "No," like, "No. This isn't a possibility. Don't do that." I don't think it's something they do here, unless you break a machine or something then they would probably be like, "No you can't use any of the equipment."

This library did its best to ensure makers could make in freedom, within the boundaries of a shared space and a mandate for equity.

Responsive Library Conclusion

This library listened to its users, and the users were largely the agents in charge of their own making. As the library navigated an entirely new (to them) way of offering library services, they responded to their users, over and over, with some variation on the theme of "yes—and we will help you if you need it, but *you* get to decide."

Chapter Six: Themes

In this chapter, I synthesize the findings from the three cases, and describe similarities and differences between them thematically. I also describe the model of capabilities that participants expressed, explicitly or implicitly, as a necessity for facilitating user power and the conviviality of these spaces as tools. I compare these capabilities to Ivan Illich's (1973) list of factors in a convivial or non-convivial tool. All of those factors were visible in this study, particularly radical monopoly, obsolescence, overprogramming, and active mastery. Frustration was rarely visible, perhaps because those frustrated with the library's offerings did not come to the library. Interdependence was visible, but not as expected. A pilot study had suggested that users found social connections to be the most important aspects of library makerspace. In this study, issues of coexistence and connecting with other users were important, even vital, but most users did not claim that social uses of the space were the most important to them.

The model of seven capabilities emerges from the power-based tensions and findings described with some ethnographic richness in the previous chapter. These capabilities are key factors for convivial tools, at least for these specific users, in these specific cases—and perhaps in other cases as well. While these capabilities encompass the expressed primary concerns, ideas, and perspectives of these participants, they may not be sufficient to all instances of a convivial tool in other systems or cases. Rather, these capabilities are the ones that emerged from *this* set of data. The Convivial Tool Capability Checklist (C3) involves the:

1. Capability of Access (physical, intellectual & sociocultural)
2. Capability of Understanding (both oneself and one's needs in the context of the space)
3. Capability of Trusting
4. Capability of Acting (rather than being acted-upon), and which involves three sub-capabilities
 - a. Having some type of say in what occurred in these spaces
 - b. Being able to give of one's own expertise in the spaces
 - c. Balancing needed help and institutional control and the range of contingencies possible in the spaces
5. Capability of Choosing (specifically, one's means and ends)
6. Capability of Coexisting and Connecting
7. Capability of Adapting (or making oneself comfortable in the environment)

As with the seven tensions, the capabilities are recursive and non-hierarchical in nature, with

each capability providing a foothold for the other capabilities to find purchase. For example, the Capability of Trusting relies upon, and feeds into, the Capability of Coexisting, to enrich the spaces, as well as the Capability of Choosing how and why one uses one's resources. As with grounded theory methods in general, these seven themes, expressed as tensions and the subsequent C3 model comprise the findings of the study (Corbin & Strauss, 2008; Bloomberg & Volpe, 2019).

Exposure – Framing

Exposure- Framing is the tension that explores the power expressions inherent in making sense of the spaces, who and what they were for, and acquiring sufficient sociocultural access to be able to benefit from their use. Since these spaces were generally new for their users and communities, organizational storytelling drove what people understood as possible within them. People were exposed to the creative place and practices in it through the lens of library stories. Library workers were storytellers, “exposing” the space to certain communities or audiences. Libraries thus exposed many people to these possibilities, while also framing the possibilities within institutionally-centered rhetorics. This meant that some audiences were exposed to the spaces, and others were not, and that the framings of what the spaces were for shifted as well. The codes for this tension identified being exposed to ideas, concepts, uses of libraries, or possibilities in one's life or the life of the community (often new ideas). This category also deals with the way in which the institution or the larger narratives of making, orients the user to education, literacy, skills, creativity, innovation, and neoliberalism/market ideologies, and frames the space in light of those ideologies.

In the small community of Welcoming, almost every study participant spoke of exposure—of feeling someone was exposed to new tools, new ideas, new ways of making, and new ways of being because of the library's makerspace. Sometimes this exposure was seen at useful for other people, not for the makers of the community who liked to create in their own personal spaces (makers Travis, Russell, Ruth). The creative place staff and users were feeling

their way around the potential affordances of the space, and making sense of how it could benefit them, whether they had access, and the barriers that were in place to those benefits. Library Manager Hannah, and to a lesser extent Assistant Manager Sue, had to translate the space and its potential to the community. While Hannah created engaging marketing materials, users of the library often did not notice them. And the location of the space meant that few people were exposed to it accidentally, requiring Hannah and Sue to constantly escort people down the long library to the space.

In this library—and to some degree the other two libraries—exposing people to the space was hard. It was a nonstop task requiring extroverted personalities, and the ability to frame and reframe the space so it made sense to whomever the library staff spoke. The framing of the space was often in direct opposition of the use as I observed it. Rather than being a space for innovation, business skill development, 21st century skills, and at-will making by creative and inspired people, instead the Welcoming space was a room for programs. Despite Hannah's best efforts to build industry and school partnerships to use the space, the framing did not match the rhetoric aimed at funders and visitors about the need to build STEM/STEAM skills. Although Hannah and Sue were adamant that STEAM—including art—was the point of the space, art seemed the predominant use. Nearly all of the participants in the study were focused on the arts rather than the sorts of digital, electronic, and even woodworking skills that Hannah framed as the space's reason to exist (see **Uplift – Fun** section).

In the Productive Library staff selected the audiences for their stories about the spaces based on their understanding of what the space was for (see also **Uplift – Fun** section), and for whom (**Communal – Individual**). The library staff members felt that they were doing a great deal to expose their communities to the uses of the spaces and their potential, for the most part within particular frameworks of technological, work skill development, and innovation use (e.g. staff members Jenna, Chuck, Janet). Many staff members felt that the onus was on the individuals to pursue information about the spaces and tools, rather than the library's responsibility to ensure everyone understood (Colin). However, they were happy to share their framings of the space and

what it could be. The workers preferred a passive approach—to wait for visitors to approach them and ask questions—rather than to proactively seek out people and inform them. In turn, they often described understanding themselves as passive recipients of the policies and practices offered by the library’s upper-tier administrators.

Programs were a main way to orient users in the other cases. Many of the users were introduced to the spaces in Responsive Library in this manner, during programs, as were all of the people in Welcoming Library. None of the users in Productive Library were oriented in this manner, because Productive Library did not hold programs like these. In that library, any programs occurred either outside of the makerspace in a school or brewery, for example, or were drop-in activities in the space itself. Those drop-in activities were rare, and I saw few participate in them.

The Responsive Library framed the space and its uses through “low” and “high” tech making. They emphasized the learning and economic opportunities afforded by making, but also the fun, play, and social aspects of using the creative place. The connection of traditional making to newer forms was a calculated strategy to expose users to the spaces and tools in a way that made sense in the context of their lives. The library staff aspired to ensure comfort (see the section **Comfort – Unease**) and sociocultural access to the space.

Who is the Space For?

In Welcoming, a library newsletter stated, “Everyone is an inventor!” and invited people to an Arduino class, to “learn how to develop your own circuits. The Arduino makes creating intelligent circuits easy for the average person” (The PCML Citizen, April 2014—that newsletter also offered homebrewing and container gardening workshops in the makerspace).

Manager Hannah wanted the makerspace to help with two main problems that she saw in the community: the lack of creative endeavors or innovative capacity, and to “teach how to succeed in the workplace, because we’ve heard from local industry that people aren’t succeeding in their jobs because [for example] they don’t know how to read process manuals.” She and

others mentioned the lost arts of shop class, sewing, woodworking, and so on (Hannah, Sue, Andrea, Dale). So Hannah chose tools and programs calculated to be familiar, highlighting woodworking as a recognizable type of making in an agricultural community.

Hannah chose the programs, books, and tools that were selected for the space:

Outside the STEAM Lab, a low shelving unit filled with a couple of hundred books called the STEAM collection. In it are books for children and adults on all sorts of crafts: cardmaking, knitting, jewelry, sewing, soapmaking, origami, etc. There are science books and math books (both “for dummies” and aimed at children), and books referencing electronics—[and using terms such as] Arduino, “innovators” “Mama gone geek,” etc. “Readymade” and other recent DIY books that span traditional and modern electronic crafts sit next to books on “bibliocrafts.” Books on wiring and septic systems (!) rest next to bicycle repair and small engine repair books. Later, when asked how she chooses which books go in this area, Hannah says that there are too many cookbooks and home decorating books to fit in the space, and that the collection is supposed to be “about innovation” rather than “repair.” (fieldnotes 4/4)

The framings modulated according to whom the institutional actors were speaking. Discussions with crafters focused on crafting, but materials aimed at funders focused on high-tech making and skill building. For example, an appeal for a better budget appropriation from the community stated, “We offer hands-on workshops that teach circuitry, woodworking, jewelry making & artistic skill building. Our ... makerspace offers training opportunities in workplace literacy, so that our local workers have the skills to succeed at local businesses and industries” (2016 Village budget final request).

In the Productive Library, the library workers’ understanding of the space was most visible in the decisions made in the large urban library about where and for whom to do outreach. The efforts to expose the community to new ideas and tools was bounded by institutional values and perspectives. For example, the outreach event in the brewery in a white, young, well-off neighborhood was not an accidental choice. Jenna, the person running the makerspace, said that the target audience for the library makerspace were those already affluent and educated young people (fieldnotes 5/24).

When I asked Jenna if the library had moved any equipment across a hall to the Computer Center, she seemed surprised. The Computer Center was a vast space filled with over a hundred computers, which were used predominantly by Black people. Many of the people there were unhoused. Even though Jenna bragged that one of the people who was homeless was using the button machine in the space to make and sell buttons, and though the library would move equipment into other areas of the library, such as the Teen library, or to library branches, she said they had not considered either hosting a program for Computer Center population, nor familiarizing them with any of the equipment. The makerspace's story was not for that audience. Most of its users were white and had homes.

For some participants, specifically those from socioeconomically disadvantaged groups, the Productive makerspace was not reflecting their understanding of the world or how they fit in it. The library was doing little to rectify this, while I was there, due to a lack of resources and/or a lack of awareness that such activities were needed. In this, they were enacting specific understandings of what a makerspace was and for whom.

Responsive Library was interested in ensuring that a wide range of makers would benefit from the creative place they offered. As library trustee and artist Erika noted, "Are you an artist? Because there the there are a myriad opportunities for artists. If you're a maker, this is your spot." She went on to note that the space was for kids and anyone who did not have money for all of the offered tools: "And lets be honest who on earth has money for all of this? Nobody." Director Richard concurred, noting that even in his mid-sized community, there was little for kids to do, particularly in the winter. Yet this space limited its use to people thirteen years old and above, limiting the use of the space for younger kids to whomever could find a willing adult to spend time in the space with them.

Librarian as Enzyme.

In Welcoming Library, nearly all the exposure at this library emanated from the enthusiastic Hannah, the library manager. She engaged diverse people and processes, introducing

community members to different conceptions of library services, the creative place, and making. She brought people together, and exposed them to new ideas. In doing so, she framed the space for them, making sense of it in a context that made sense to them. She noted:

Somebody who may not have had making in their past... it's difficult when I'm presenting to them because they just don't have that mindset. They want it, but they don't know what to do.

This was a problem in all three spaces, as some users struggled to make sense of what they could accomplish there. To remediate that problem, Hannah would corner people in stores, speak to them at bars, ask questions when getting some art framed. And these conversations bore fruit. Not only did Hannah personally spread the word about her library's creative place, but she also met people who made things and were willing to volunteer to teach. Similarly, as she exposed community members about the concept of the space, Hannah framed what the space was all about. She knew she had to frame the space in ways that made sense, and she knew she was not exposing enough people or in the most effective ways:

The woodworking tools provided a nice segue into making because it was familiar for a typical agricultural community...

I had this dream, like in Chicago, that people would just wander in and start making whether it was woodworking or designing on a computer or using the 3D printer to print out something innocuous. But that didn't happen and repeating what we talked about before, people need to have that Thursday night at 6pm to 8pm where there'll be an instructor and they'll tell them what to do and then sort of give them permission to express themselves. (Hannah)

She was responsible for it all, from these informal conversations, to prepared speeches, press releases, and elaborate marketing materials. Her outgoing enthusiasm did most of the heavy lifting in exposing people to the makerspace.

Staff in all three cases provided tours, both formal and informal, for interested users. In these tours staff members described the various tools and programs, gave examples of user created projects, and enthused about the potential of the space. In Productive Library, staff provided group tours provided, including demonstrations with the equipment (fieldnotes 4/12,

5/6, 9/12, “Conducting a Tour for Adults in the MakerSpace”). But these orienting tours only occurred when a large group solicited one in advance, or when the busy staff members noticed a patron was looking lost. All too often, those lost patrons left the space with no greater understanding of the space than when they entered.

In my observation, women and Black men regularly stared silently at the Productive Library space, then left, (fieldnotes 5/9, 5/12, 5/23, 5/24). Yet the people who were male, appeared confident, were already conversant with digital technologies, and/or were in a close relationship with the library, appeared more comfortable in finding out what the makerspace meant in the context of their lives, or said that they understood it (e.g. fieldnotes, 5/17, 5/24). Exposure to the idea of a library makerspace appeared challenging for others. I overheard many people say things like, “I have no idea what I would do with that,” in each of the library spaces. Users and non-users, in Productive Library in particular, described their blindness to the potential uses or purposes of the makerspace. To rectify that blindness, Productive Library focused on passively informing users of potential uses of the space with displays of unlabeled objects in glass cases. Visitors to the space often had no idea what the objects were or even which tools could make them (e.g. Melissa, Beth).

Some staff in the Productive space were reticent to do the sorts of active outreach that Hannah did in Welcoming Library, or Olivia did in Responsive Library. The “librarian as enzyme” model²⁸ I saw in the other cases, and in earlier research, speaks to the proactive practices of connecting people to each other and to ideas, best exemplified in this study by Responsive Library’s Olivia, who was the staff member in the space most evenings. She practiced a form of hospitality in which she reached out to every person entering the space, made sure they were comfortable, that they understood the space, that they met someone if possible, and that

²⁸ The “librarian-as-enzyme” term describes the sort of proactive connective work exemplified by study participant Olivia; wherein the library worker intentionally breaks down barriers and heightens a sense of interconnectedness with the space, tools, and each other. The term was inspired by a conversation on 9/22/13 with Max Yela, the special collections librarian at the University of Wisconsin-Milwaukee.

they saw some of the potential projects in the space. She mixed things up, got things cooking, ensured that the potential for making and connecting was activated to the best of her ability.

These enzymatic librarian practices resonated. Users such as Jack and Fred indicated that their comfort in being in the space emanated in part due to Olivia's hospitality. In addition, because of the people like Justin and Richard, who hired her and valued this hospitable librarianship—the culture of the Responsive Library space was interactive. Several regular users and staff members were gregarious, welcoming, and curious about others' uses of the tools, which signaled that social interactions were welcome in this space.

Signs and Sign Blindness

Several of the staff working in the makerspace in Productive Library lamented the lack of signs (Jenna, Caleb, Nick, Aaron, Liam), as did several of the users of the space (i.e. Tanya, Candace, Sean). It was a point of contention. When I asked the second in command of the space, Colin, how people know the rules of the space, given the lack of clear signage or rules, he grimaced, "They don't. We have to tell them. So a lot of times we don't know what they don't know, because we're used to it."

In Responsive Library, user Fred spoke about the need for structured processes for making sense of the space, not seeing that such processes were in play. He (and many other study participants) did not notice signs offering workshops and classes, for example. Similarly, signs were ignored in Welcoming Library, despite being well-designed, consistently branded, and ubiquitous. In fact, this was one reason the library staff in Productive Library mentioned that they offered minimal signs—because patrons did not read them. Yet this was a problem in that space, as users tried to expose themselves to the space and sought out orienting signs. Sign blindness was a quandary familiar from my own time as a librarian. How can one expose one's community to the many opportunities the library offers, I wondered, if even regular library users are blind to the ones not three feet away—and complaining about the lack of them? How many signs are the right amount, and what should those signs state? In this study, all three libraries

struggled with this issue, with Productive Library essentially giving up on signage and requiring users to engage with the staff to learn most of what they needed to know about the creative place. In contrast, Welcoming and Responsive libraries tried to signal relevance with consistently branded and designed signs throughout the library. Neither strategy worked very well.

The Capability of Understanding (Oneself and One's Needs in the Context of the Space)

Deriving from the tension **Exposure – Framing**, this capability aligns with Illich's (1973) concern about engineered obsolescence. Such crafted obsolescence tells people they are insufficient until they are certified by an institution with some socially-desirable mandate, “making it unfeasible for most people to relate themselves in action to one of the great dimensions of their Environment” (p. 91). He described the path to this obsolescence of tools, ideas, or people as occurring when an institution or profession “hold[s] power by concession from an elite whose interests it props up” (Illich, 1977, p. 17). The ways in which library narratives framed these spaces, and the audience for which they were intended, was grounded in discourses of obsolescence: People needed “21st century” skills, according to library workers. Exposure to these skills and affiliated tools should “lift up” the poor, the uneducated, and the unemployed, according to this thinking.

Discourses of obsolescence were woven into the hidden curriculum of what should be learned or done in the spaces. This hidden curriculum links to each library's valuation of learning and economically-viable creativity and innovation (e.g. Hannah stated the space was for innovation, not repair). The hidden curriculum deals with the cultural value libraries place on learning and economics, as discussed above, but also values of ambition, self-reliance, autonomy, punctuality, and compliance or respect for the library's authority. This hidden curriculum or understanding of what the spaces were for shaped the framings of the institutional actors or media descriptions of makerspaces, when they exposed their communities to the spaces, and shaped how people understood what was possible. Creativity and play are encouraged in service of economic goals, although the users of the spaces resisted these goals. Instead they made gifts,

played with the tools, and expressed themselves through programs. In all three libraries, some users made things that they wanted to make despite the library rather than because of it—the tools allowed them to make, but the rules had to be circumvented. This was visible when users learned to come to the space only when particular staff members were there, when their backs were turned, or when users left the space rather than wrangle the library’s requirements. Mostly, however, the library users internalized the hidden curriculum into their understandings of the spaces and their rightful places in them. They devalued their work when it did not fit well with what they perceived as more important values or uses of the spaces. This occurred in all three libraries.

Institutional framing of the spaces circumscribed the limits of the users’ power to understand the creative space as a convivial tool. If one is not interested in learning or uplift, in 3D printing or working alone to create a “successful” project, spaces like the Productive Library are less useful or convivial tools. Similarly, if one is unaware of the library’s services, despite consistent outreach efforts, as in Welcoming Library, the space is not a convivial tool. In this study, many library actors assumed that people were naturally creative makers and only lacked physical access to tools to learn and make things. Unfortunately, this was the case for *some* people, while others had little understanding of what to make, how to make it, or why they should bother learning. This lack of understanding was often linked to library practices of informing people of the possibilities of the spaces. When few signs, programs, orientations, or actively-engaged library workers were present, the Capability of Understanding was limited.

What one understood shaped what one could do in these spaces, and vice versa. Individuals, even those working in an institutional capacity, identified the role of knowledge as critical to the sense of power that individuals expressed. Information itself—and the library that was supposed to provide it—*was* power to many of the participants, and it was often best acquired through structured making experiences such as programs. Consequently, Responsive Library did the best job of supporting the Capability of Understanding what the space was and tried to ensure everyone saw some type of reason to use it, by publicizing a variety of making

activities to a variety of audiences, resulting in the most convivial tool in terms of exposure and framing.

Access – Barriers

Each of these libraries aimed to support physical and cognitive access to the tools they offered, and to learning opportunities so that the users could benefit from using the creative places. Yet there were many barriers to that access. Sociocultural access was supported the Capability of Understanding described above, and existed in the state of tension described in **Exposure – Framing**. This tension expressed the other issues with access and the often library policy-based barriers to that access. The codes that comprise this category identify the way individuals or groups have access, or the barriers to access. These can include physical barriers of things like time, money, not enough tools or the right tools, etc. Or it can emerge from intellectual access—the skills or abilities to use the space and tools. It can also involve emotional labor, such as the work done to ask questions, make people feel welcome, and so on, when that prohibits or enables access. In addition, this category involves discussion of access as a reason for the spaces or for libraries more broadly, and intellectual freedom to access materials and tools.

Productive Library was just that, productive. Because of the access people had to expensive equipment and knowledge of how to use it, they were able to produce a constant stream of signs, buttons, designs, laser cut objects, stickers, and music. But this access was challenged by many factors, from needing to know to ask for things to needing to negotiate a challenging tool reservation system. Access to certain tools, information, extensions on using library equipment was all mediated by the users' ability to ask for help. Library staff said that patrons had to know who to ask for things, and how. Without asking, a patron in Productive Library would not know that there were printed materials to assist their intellectual access, just as they would not know that they could improve their physical access to machines by requesting time extensions.

However, some materials that participants identified as helpful were not always

accessible, such as educational materials on how to use particular tools (staff member Nick), or tangible examples of how to use the space (users Beth, Melissa). Also, barriers to intellectual and sociocultural access determined whether a user could accomplish their goals in the space. For example, a tool to set grommets could sit displayed on a table, but if a user did not have any idea of what the tool was, they might not feel as though they had physical access to a grommet-setter.

In Responsive Library, long-time maker Roger spoke of the welcoming, access-centric model of library services, which he saw as building trust and comfort in the spaces and services for a wide array of community members. Wyatt discussed how unlikely he was to use the makerspace for his creative activities, since he used sharp woodworking hand tools, such as chisels, to make. He thought such tools would be prohibited. These makers were aware of the balancing act of ensuring that ALL people could use the space and how that scraped uneasily against the possibilities for SOME users using the space for all their making needs (see **Communal – Individual**). Access was thus broad, but also shallow. The people left out of the equation were often the existing makers like Roger and Wyatt, who helped shape and develop the space. For example, Roger discussed problems of limited storage acting as a barrier to allowing the types of long-term projects many makers wish to do in makerspaces. He also bemoaned the ban on running long prints on the 3D printer, which Justin also struggled with. These limits to controlling the outcome of the use of the tool, or using one's personal energy as one chooses, were often related to such access issues (see the **Subject – Object** section for more discussion of this). These limits were sometimes perceived by users, but not the reality, as the library would allow more than these makers assumed (as with musician non-users Xavier and Jordan).

In the smallest library, the community of Welcoming had many barriers to access, even as staff such as Hannah and Sue strove to make technological and creative tools accessible to their community. In terms of physical access, they were somewhat successful. As 3D printing class member Jerry mentioned, many of the participants in this case were surprised and happy to have tools such as 3D printers made available to them. However, the sociocultural access of being able to contextualize the utility of such tools, and the intellectual access of knowing how to use them

were both lacking throughout the community. The staff made valiant efforts to remedy these barriers, but often what users needed and what the library was able to do were worlds apart.

In Welcoming Library, few people in the community knew about the space, the tools, or that anyone could use them at any time. The lack of lighting, the closed doors, the “backstage” appearance of the storage—all that suggested that this space was not for the public. The appearance acted as a barrier to access to the tools, space, and building a community of makers. This reflected a deficit in the community’s Capability of Understanding—their lack of sociocultural access. But in their policies and selection of all sorts of creative tools, from woodworking and fiber arts to robotics, microprocessors, this library wanted to support access for their community. Library staff left the library building to do outreach, worked hard on developing partnerships, and advertised extensively as they could.

In this case, the barriers to access appeared more about a small community’s deafness to the library, than the library’s lack of trying to shout loud enough for everyone to hear. The reasons for this disconnect may be related to a lack of local newspapers or newspaper readers, local television or other shared media (Hannah); to a community fractured by the prevalence of commuting or other socioeconomic and geography factors (fiber art workshop participant Vivian, partner organization member Lisa); or to some other reason. This question of why the library suffered a lack of purchase in the local community’s lives is not the focus of this study, though all of these factors were identified by participants. Regardless of reason, the fact is that the lack of knowledge about the space was the main barrier to access in this community.

Staffing Models

The Welcoming Library had no funds to staff their creative place, thus it often remained dark and unused. Only two of the four library workers in Welcoming Library were conversant with the equipment. They were able to assist users in lessening barriers to intellectual access, while the other workers felt those barriers themselves. The barriers to learning skills for the workers at these libraries translated into limitations on how the users might learn skills. If Sue or

Hannah were not available, users had to wait or return later.

In contrast, Responsive Library's creative place was always staffed. When their help was not needed by users—most of the time—the staff worked on preparing for future programs or other library work. When several users needed the help of the staff members at once, they prioritized needs according to a first-come, first-served principle, but took breaks from an intensive problem to address brief ones. The creative place was only open for five hours on weekday evenings, and for seven hours on two Saturdays a month—much less than the overall library hours of operation. This limited access for some people, who could not come to the library at those times. Funding for staff hours were limited. This mean that there was also limited intellectual access to the tools, since with few available staff and little time, they could not always teach people to use the tools, or to connect users who had skills with those who did not. Some of these limits have since eased, since in 2022, the space opened for six days a week, though still not at all times that the library is open (Responsive Library, 2022, March).

In Responsive, badging classes were sporadic, due to staff constraints and other programming in the space. These classes tended to fill up quickly, and patrons could only reserve a place in them when staff opened up the program in the online calendar. A user might have to wait weeks or months before being able to use equipment. This occurred when I wanted to be badged to use the laser etcher, which I already knew how to use. It took a special dispensation from the staff to allow me to be able to use it without waiting another month for a badging class. Part of the limitation on the resources in this case—and the others as well—was a lack of reliable funding. Nearly everything in these spaces was funded by grants and donations, and existed outside the library's tax-funded regular budget, except for staff hours.

In Productive Library, even though the space was always staffed with at least two, and more often four or five staff members, staff felt they did not have enough time to ensure intellectual access in particular. The staff there tried to assist users in deepening that access, but often resorted to sending users to a video library at Lynda.com to find answers on how to use the tools in the space.

Fees

All three libraries ensured materials and tools were free or inexpensive, in their estimation. In Welcoming, 3D printing costs were subsidized by the library, and other printing costs for things such as posters or banners were low cost. Most classes were free, with the library providing materials to the participants through grant or donation funds, or using the library's tiny "supplies" budget. Such low prices facilitated access. In both Responsive and Productive, the supplies that were available for were not intended to be moneymakers, but did need to offset the expense of staff time in making them available, and were intended to ensure the library could continue offering such things. Thus the, pin-backed button blanks were ten cents apiece at the Productive Library could be purchased for less than half of that if purchased in bulk. The library priced them to "keep people from going too crazy" and turning the library into a button making factory (fieldnotes 5/11). In this library, some supplies were provided under cost, and others were over, so the library could simplify its price lists and break even (e.g. "Vinyl Printer Breakdown," Productive Library). The low prices made an enormous difference for many people using the vinyl printer/cutter at the Productive Library. Groups could spend \$12 dollars on a banner that would cost over a hundred dollars if professionally printed. Individuals came and used the equipment for doing things they could not consider doing if they did not have access to low-cost equipment and supplies, from playing with free pin making equipment (Felicia), to donating items to improve communities (users Gladys, Dana, Rose, Victor).

Some fees were higher and the staff knew that the charges prevented access. The setup fee for the Espresso book binder was a particular concern. Team leader Jenna said, "when we originally got this pricing structure, I was worried about the \$40 set-up fee. I was like, 'This is going to be a barrier to service'" (fieldnotes, 5/4). But due to the intensive staff time required to set up the book files, she felt she had to set that barrier to keep her staff member, who spent about 20 hours setting up and printing one book, from being swamped.

Policies and Procedures

Productive Library kept their policies simple, though they had many rules impacting patron behavior, including no sleeping, eating, or using certain computers to do certain tasks. As Jenna noted, often the rules and limits were not written anywhere: “I don’t think it’s in the policy anywhere. It’s just kind of our thing.” In the Productive Library, some staff said users must be 11 to use the space alone (Nick), others said there were no limits (Colin); there was no written policy.

The inconsistencies to policy in this space were a challenge for the users and staff alike. Each staff member applied the rules as they understood them, in a complex negotiation between what they believed a patron deserved, what the rules actually were, and whether anyone was watching to see the rules being bent or broken, and the staff member’s place in the bureaucratic hierarchy (staff members Nick, Liam, Joe, Jenna). At times neither the users nor the staff knew the rules, but the staff tended to cover this gap in understanding with feigned competence (fieldnotes 5/16, 5/26). “Fake it until you make it,” was Jenna’s mantra when the staff were unsure about how to apply the rules. This left the users in a state of powerlessness however, with the rules unknowable.

The lack of signs, as noted in **Exposure – Framing**, were a significant barrier to access in Productive Library, and were a metaphor for the confusion some staff felt about what was or was not allowed, or why. Some staff, like team leader Jenna and her second-in-command Colin, felt that they were not entitled to ask questions, but had to interpret sometimes obfuscated policies on their own. The makerspace staff knew that the lack of locational clues, such as signs, impacted the accessibility of the space in Productive Library. But they felt powerless to change anything, fearing the wrath of some administrator. Fuzzy lines of communication among a complicated library bureaucracy impeded access, as did inconsistent practices among the staff.

At times, particularly in the Productive Library, the policies, written or otherwise, were bent or interpreted loosely by the staff. For example, one day young staff member Ashley explained allowing someone to change the vinyl in the printer with a shrug, saying “I just went

with what he said because he seemed pretty confident that he was allowed to” (fieldnotes 5/16).

On another occasion I watched staff member Liam make up a rule:

A middle aged person wanted to bring protein bars into the recording booth, and he allowed it because they said they had diabetes and needed to have food regularly. I knew food and drink were not allowed, but he listened to them and said, “there’s an exception to the rule for medical reasons.” Afterward I asked Liam about whether this was really a rule and he laughed, “Not that I know of, but it should be.” (fieldnotes 5/26)

Others allowed patrons to do things that were not allowed in the space if no one was watching, like change the 3D printer filament.

Similar rule-bending occurred in the Responsive Library. Young teen Mason was a regular user, perhaps because the staff practiced what James C. Scott (2008b) calls “weapons of the weak.” The workers at the library—even Justin, who was one of the top-level administrators—felt somewhat constrained by the library board’s decision to make the required age for unattended minors in the library 13 years old. So they avoided checking to see if the rule was being breached by an avid and excited maker like Mason.

Other staff members perhaps saw this differently. For example, Leslie, the marketing and PR person at the library, had scolded Mason, such that he would not go into the makerspace if she were working there. They had a history of conflict:

Leslie shushed Mason and Jack, who were very slightly rowdy as they worked on the 3D printers. Mason was flinging bits of filament at Jack, not in a dangerous or particularly messy way, just flicking them onto Jack’s shirt, and Jack was exasperatedly picking them off and piling them up on the table. I asked her later to talk about stopping that, and she said she did not want things to get out of control, and believed in “nipping things in the bud.” I am sure I’ve seen similar things pass in front of Olivia and Shelby with no corrections. (fieldnotes 9/1)

There was also an incident where Leslie forbade Mason from creating a phone case using hot glue, that later Olivia not only allowed, but took photos and bragged about how cool the idea was (fieldnotes 9/10, 9/13). Despite his conflicts with Leslie, Mason’s access was important enough to the staff that they dodged rules on his behalf. I saw several other instances of the staff passively

resisting the rules, as when Olivia looked the other way when she saw a user change a bit on the CNC mill, even though she was supposed to take care of it. The user was doing it correctly, she said, and shrugged (fieldnotes 8/26). In fact, later she learned that users WERE allowed to change the bits. Commonly, the staff turned blind eyes to things they decided were acceptable even if they were not in the rules. As Justin said, “I want to give people what they want and I don’t have to change the system every day. I just want a more peaceful house, you know.”

There were safety policies and age limitations at the Welcoming Library, but minimal rules—perhaps because of how little unsupervised use the space had incurred. The library offered some hazardous power tools, and staff said they did not need to watch over users as they worked with them. However, no users touched these tools when I was in the space, outside of a supervised program.

Location Location Location

The subterranean location of the space in Responsive Library limited access in some ways, and expanded it in others. The space had been conceived as located at the entrance of the library, where everyone could see and, ideally, understand it. The subsequent placement of the space downstairs meant that it could be much larger and with more tools, but at a sacrifice of the prime location for exposing potential users to it. Many of the library users using computers and grabbing DVDs and books upstairs had no idea of the space and the making occurring beneath their feet (fieldnotes 8/27, 9/15), despite the signs and visual clues.

The location of the Welcoming Library makerspace suffered from similar issues. The creative place itself was at the end of the long snaking row of classrooms. It was accessible through double doors from the children’s area, and was not visible from the entrance to the library or the circulation desk. The doors had one small pane of glass in them, and were marked with a gear/lightbulb graphic that acted as a logo for the creative place. Often these doors were closed, and/or the lights in the space were turned off. Many of the affordances of the space were hidden in this space, with most tools, by the end of my month in this library, in large, unlabeled,

lockable cabinets.

The Productive Library's creative place was also near the Children's Library. It was located in a large area, visible and well marked as a "makerspace" with glass walls revealing what was in the space. However, it was not near most other adult services in the library. One had to travel over "the bridge," a wide hallway and periodical reading room that spanned a street below, to reach the space, which was located next to the teen library. Despite this location, few teens or children used the space while I was there. In the areas more commonly used by adults in the library, there were almost no orienting signs to suggest a makerspace existed in the building. One small sign mentioned "Makerspace" in the Tech Center of the library, but there was no description of what that space entailed.

The Capability of Access

Illich (1973) described *radical monopolies*, or the tendency he saw in institutions to adjudicate "a special kind of social control ... enforced by means of the imposed consumption of a standard product that only large institutions can provide" (p. 65). In this study, whether a given user in a community had access to the creative places rested upon that social control and whether they had a use for the standard product being offered by the library. This access could be physical in nature, or intellectual and skills-based, but was also the sort of sociocultural access described in the **Exposure – Framing** section. While tensions in sociocultural access rose to the level of requiring its own theme exploring how people were exposed to the space and how it was framed for them, physical and intellectual **Access – Barriers** were also important findings.

Access was limited to different degrees and by different practices in each library, but was a vital capability in all three cases. Welcoming Library placed very few limits on physical access, and the access barriers in that library were more visible in the lack of sociocultural understanding of what the space was for and how someone could benefit from it. In addition, users suffered a lack of access when it was not apparent that the room was open and available to them. Limited staff and staff knowledge also constrained intellectual access. Many of these participants reported

wanting or needing a librarian-as-enzyme model of outreach or structured programs to understand the relevance of space, to benefit from it, and thus have access to it. Welcoming Library workers were eager to develop all three forms of access, but suffered from a lack of resources to assist people in at-will use of the space, resulting in a glorified programming room. Staff also positioned the space largely in the context of learning and skill-building, for career development, but also supported art and self-expression.

In Productive Library, barriers existed to all three types of access. Physical access was restricted by tape over buttons and library staff taking over tasks, strict policy limits on tool use, complicated and confusing tool-reservation interfaces and procedures. Access was limited by a “just-ask” culture where users were required to interface with staff to understand how the space worked and what was available to them to use, including equipment removed from service due to its fragility or safety concerns. Intellectual access was mediated by overburdened staff who could not or would not commit to intensively teaching on a one-on-one basis, and a lack of workshops, programs, or peer-learning opportunities. Due to Productive Library’s focus on providing physical access to create objects, without the sociocultural or intellectual access support many people need, large swathes of the community had no way to benefit from the space. The space was intended for learning and users were expected to learn, but to do so on their own, through the library’s provision of a digital library of how-to videos.

Illich (1973) claimed that the perceived legitimacy of claims to high-level industrial outputs like professional skills, determined that people without those claims (such as those suffering homelessness, or other marginalized populations) would be discounted. This was the case in the Productive Library. Those people were “obsolescent,” or situated on the “wrong” side of an imbalance in the “the power to make effective change” (p. 88). While staff members stated they were the ones who could most benefit from the acquisition of those skills, little effort was made to ensure their intellectual or sociocultural access.

Responsive Library limited physical access through policies for children and the time allowed to use tools. As the space developed and the conflicts in sharing equipment became

apparent, barriers were both increased and eased by more clarity with reservations of the equipment. Physical access was eased by ensuring that equipment was visible any time that the space was open, but the space was open a fraction of the library's overall hours of operation. Intellectual access was well-supported with workshops, group training, and individual assistance. Advanced makers encountered some barriers to access in that library related to perceptions of intellectual freedom barriers and storage and mess constraints.

When examining all three public library creative places, it becomes clear that the makerspaces are not helping all groups or individuals, and many are excluded through library discourses and practices, even when the library actors intend for access to the spaces to be inclusive and helpful. Two of the three spaces are aimed less at making than at learning about making, with a heavy emphasis on building economically viable skills. The favoring of certain types of people reproduces existing inequities, ensuring that white, male, young, and digitally savvy people have more access and ability to benefit than others—until they are advanced in their making. Then, the utility of the spaces becomes constrained by things like the number of tool uses allowed in a day or a month. In fact, users in these communities had little access to a Makerspace per se; instead they had limited access within a Learningspace.

Trust – Doubt

Trust – Doubt is a tension describing issues of social trust in the library creative places. This trust or doubt can be of one's own capabilities or that of others, or even of tools, and can be expressed through limits on user capacity to make decisions or express power through using the spaces in particular ways. The trust or doubt can also be expressed in regards to the relevance or development of public library services, or in which understandings are authorized or legitimate. In many ways, trust both generates and is generated by the tensions in other areas. For example, how a person is exposed to the idea of the makerspace, and how it is framed (the tension of **Exposure – Framing**), can result in trust or doubt.

This was visible in the distrust expressed by Logan and Xavier, non-users in the

Responsive Community. These teens did not believe that recording services were available, and/or they did not believe in the library's capacity to allow them to create on their own terms. Their doubt meant that they seemed unlikely to ever come to the library to investigate their access to the equipment. Yet, the library that Xavier and Logan distrusted would have likely trusted them. Justin, the person in charge of the space, said he had a default "yes" position when asked about something in the Responsive Library space, "The No's should really only come out of, 'Is this something that affects our ability to offer the space or the equipment to somebody?'" This library embodied a culture of "Yes" as much as they deemed possible, the library staff believed. The users of the Responsive Library appreciated this stance. As older user Fred noted,

Let's start with the permissive atmosphere around some safe boundaries and then, you know, try to keep that as much as possible... I appreciate that. You know, things will come up that you can't foresee. People always find a way to, you know, maybe stretch things beyond what they're meant to, but that's community. The point of it is learning to deal with each other and, you know, the give and take of that and figuring out, "Okay, we'll figure a way to move forward." So I think that's a healthy process.

This "healthy process" was negotiated with the community on the basis of trust, and it worked well, for the most part.

In the Productive Library, a great deal more distrust was described, both on the parts of the users and the library staff. When potential users of the creative place left without figuring out what the space was or how they could use it because they did not wish to disturb the librarians or look foolish in asking questions, they were expressing a lack of trust in the library staff. But also they were demonstrating a lack of exposure to the possibilities of the space. Trust and exposure went hand in hand in this space. However, people are not always willing to ask questions of those who do not look like them, particularly if they are people of color. The fact that there was a sole Black employee in the makerspace may have limited some people's ability to ask questions, though this is conjecture, and no participants mentioned this issue.

Nevertheless, trust in the Productive library and its staff seemed to vary based on each person's socioeconomic status. At the same time, the library staff's trust in their users depended

on similar factors. Some users were allowed to load rolls into the vinyl cutter/printer, for example, while others were not trusted to do so. Namely, staff allowed a white middle-aged professional male to load the machine, but they did not allow Rose, the retired African-American woman who used it a few times a week (fieldnotes 5/16). Educational attainment, race, gender, professional status, and experience with certain tools all came into play as the institutional actors decided to trust some users to do some things.

In contrast, the Welcoming library had the trust of its community. I never heard a word against this library when I was there. The users or non-users (such as Reuben) indicated that any lack of trust was grounded in their own lack of skill or understanding. The library trusted their community members to be curious enough to try the library's services, and to be careful while doing so. They offered tools so potentially risky that users in the other communities doubted they would ever be made available in a library setting (e.g. Productive user Victor, Responsive user Roger). They had few rules limiting the use of the equipment, though some library staff seemed to distrust their community's ability to be creative without prompting:

So we had the Daisies [Girl Scouts] come in, these six to eight-year-olds and they had to make a Mother's Day card. They had blank paper and crayons next to them and they didn't know what to do. They said, "Can you help me. I don't know what to do." And you know, here we are as adults and as makers ourselves, we're thinking, "Well, just draw a daisy and put Happy Mother's Day and then fold it in half, you're done." But I fear that art is getting lost in the schools because they have so much, so many deadlines and criteria to meet that there's just no time for that creativity. And it was that that really propelled the idea of the Makerspace. I found that with adults as well. I saw it with the teens... (Hannah)

Assistant Manager Sue concurred with this idea, and even some users mentioned that community members might be unsure what they would want to do in the space (Lisa, Linda, Jerry, Trevor). In the felting class, however, everyone seemed confident in their abilities and their own creative vision, except for shy fiber art class participants Abby (at first) and Eva (who second guessed herself or wanted "expert" validation for her choices).

Breaking and Building Trust

At times, library staff in Welcoming Library appeared to violate their users' trust, or to challenge conventional notions of privacy for patrons. I heard staff members gossip in front of patrons about named community members. One time assistant manager Sue spoke to me about how one patron's entire family was "not terribly bright" and "always a problem." Another time, Sue taught a teen art class in the makerspace, which I was not able to observe, then came back to the front desk, where I was observing nearby:

Sue came in and started talking to Louise. She started talking about one of the teens in her group...I couldn't hear the whole conversation because she did use a quiet tone. However I did hear some of it, something about a counselor and "the school did wrong" and "the girl is having a rough day." And it seems to be like a pretty huge breach of privacy to me to talk about someone by name like this—I'm uneasy. There were two patrons sitting much closer to Sue than I was—they might be able to hear. But Sue also said "So I'm relieved—this year she's had a rough time, and we talked about doing art journaling." Sue was talking about helping the girl deal with her problems through the use of art. She did reveal all the girl's private information to Louise and anyone else listening in, but she was doing it though her concern about the girl. She told Louise that there was a special art journal kept for this girl to use, and showed her where it was. She said that Louise should give it to her if the girl looked like she was having a bad day. (fieldnotes 4/21)

In my fieldnotes that evening, mulling over this incident, I realized how complicated trust and privacy were in this situation, as Sue was trying to assist someone in need, but perhaps violated the person's trust and privacy while doing so. These negotiations of privacy challenged what some might view as acceptable librarianship. I saw none of this sort of behavior in the other two libraries.

The same day as Sue violated patron privacy in openly discussing a teen's emotional problems, Sue also dove into assisting a couple in locating a new apartment.

I overheard a couple at the circulation desk say they were looking for a new apartment and Sue immediately thought about this, and asked if they had tried at this place or that. They had not asked her advice or help in any way. Then she actually placed a phone call—without even asking if they wanted her to—and

asked a local landlord if there were any apartments open or will they be open in a couple of weeks. There were! She passed along that information to the couple. And then she got even more information for them from a brief conversation with Louise, who offered some other ideas. The couple appeared relieved to have some new leads. (fieldnotes 4/21)

The proactive assistance and outreach these Welcoming Library workers did appear to cement deep bonds of trust between people who used the library and the institution, which also appeared to resonate to other community members. People who never stepped foot in the library “heard they were doing good work there” (Garrett), though sometimes they could not say why or how that work was occurring (Lisa, Stanley). Except for city official Stanley, everyone was in favor of the library, even if they had no interest in using it themselves. This speaks to a high level of institutional trust among the community. I did not see similar proactive trust-building in the other two libraries either, though Olivia, the main staff member in the Responsive Library, was hospitable and people did describe trust in her.

Relational Equity

In each of these cases, relational equity, or symmetry in power or status, was key to trust. It was visible when users trusted themselves to be equals to the library staff. For example, some users appeared to trust that their interest in the space was important enough to “bother” the library staff and ask questions, while others did not. Some users assumed that the staff would be unwilling to help them (e.g. Anthony, Luisa, Xavier), or were unwilling to “bother” the library staff (George, Samantha, Layla, Aidan). Women and Black men often left the Productive Library space without “bothering” the staff or figuring out what the space was for because they did not appear to trust that their interest was important or would be supported (fieldnotes 5/5, 5/12, 5/24). Participants such as Aaliyah, an African-American non-user without a fixed home in the Productive Library, appeared to feel “less than” the library staff—less important, less knowledgeable, less worthy of attention. On the other hand, people such as white male users of the Productive Library Sean and Victor expressed relational equity. They appeared to believe they were socially on the same level as the mostly white and male library staff. They expressed feeling

comfortable using and inquiring about the space.

White men seemed to trust their own technical proficiency as well. When I asked men about using new tools, they indicated that they felt confident that they could learn how. For example, men who had not used the 3D printers before indicated that they trusted their own ability to figure it out. That confidence sometimes waned after a very technical set of 3D printing workshops or a surprisingly complex piece of equipment. In contrast, in all three spaces I never saw a woman 3D print anything on her own, unless she worked for the library. I saw one young girl do so, in Productive Library, though she was one of a few people to state that the staff “pressed the buttons” for her—indicating that they did not trust her to do so correctly. When I asked some women if they would 3D print something, they demurred, saying they did not have the skills.

Power Sharing

Power was revealed by whoever had the capability to make decisions in these spaces. This capability was mediated by librarians and staff based on who they trusted. In the Responsive Library advisory committee, the library trusted people they identified as makers, and then trusted these makers to make some decisions. However, some of the advisory council members were aware of the limits of that trust, and found it frustrating. Yet, this library appeared to believe, that relational equity is a key component of making, especially in terms of age. This was visible when young users demonstrated skills or tools to older users (e.g. field notes 7/28, Olivia). Still, perceptions of asymmetric power relationships were a negative factor impacting trust for some young people. At times, they felt unequal to some of the adults in the spaces, at times unable to ask questions, or unable to advocate for different rules (users Chloe, Claire, Dylan, Desiree, and non users Logan, Xavier), though Dylan found he did not have to make way for adult users. However, others, such as the older minister Fred, felt no desire to share power in the space. People in some of the programs, such as Tessa, indicated that they were happy with whatever the library wanted to do.

The Capability of Trusting

Social trust is the core capability for users to decide whether they can believe the library will allow them to do what they need or want to do in these spaces. If users do not have this trust, they do not use the library or the space. Similarly, the library that does not trust its users does not offer a creative place or places significant limits on what is accessible there. This type of trust is foundational. Without it there are no creative places in libraries or users in them. In the Productive Library creative place, the staff felt under siege from both a distant and enigmatic upper administration, as well as a sometimes hostile or demanding public. They doubted their roles, their power, their communities. In this space, the lack of trust resulted in arbitrariness or its opposite, strict rule-following when rules were clear. It resulted in knowledge-hoarding, occasional apathy, and a concern more for “successful” projects than ensuring users’ actual needs were met. When a staff member in this library trusted the people they served, it stood out.

Library staff in all three spaces favored the types or groups of people who already had the education or privilege of understanding and using the spaces as the library preferred them to. They demonstrated this favor through small benefits such as allowing one-on-one badging on a tool or by allowing the user to change 3d printer filament, but also through the selection of equipment or positions on Advisory Boards. In the Productive Library particularly, the staff appeared to trust certain types of people more, allowing them to interact more with the tools in the space. For example, Productive Library did not trust that people who are homeless would be interested in making, preferring to trust the interest of the white, middle-class families or people who can do the intellectual and emotional labor of figuring out the space and its tools. Responsive Library trusted the white middle class “makers” chosen to populate their Advisory Board, but only so far. Welcoming Library did not appear to trust some users over others, but they still privileged some users over others. Manager Hannah, who spoke of trusting her users and responding to anything they asked for, dismissed a request for a spinning wheel while accepting a request for a laser cutter. She did not trust her users to choose tools that met the institutional goals.

In contrast, trust in the institution remained intact for most people. People largely trusted the library, its staff, and its users. This ranged from near-complete trust in Hannah, the director in the Welcoming Library, a great deal of trust in the Responsive Library, especially for staff member Olivia, and moderate trust in Productive Library. In fact, some of the frustration in the Productive Library could be linked to a sense of dismay over failed expectations of trust, as with the older African-American user Rose.

But in all three cases, users often did not always trust themselves or one another to generate ideas, create things safely, or share equitably. Self-doubt was one of the biggest barriers to use. Illich (1973) addresses this self-doubt and the co-opting of trust by institutions in the concept of *polarization*. He says polarization between the haves and have-nots of our culture is a disruption due to unchecked and uninterrogated growth in technological and institutional advances that privilege the few, and result in a sense of increased helplessness on for the rest:

[There is a] broken balance of learning. People who are hooked on teaching are conditioned to be customers for everything else. They see their own personal growth as an accumulation of institutional outputs, and prefer what institutions *make* over what they themselves can do. They repress the ability to discover reality by their own lights. The skewed balance of learning explains why the radical monopoly of commodities has become imperceptible. (emphasis in the original, pp. 82-83)

This radical monopoly was most visible in the people that could not imagine making anything worthwhile in the creative places, or who preferred structured programs to tell them what to make and how—although those programs also helped people obtain sociocultural access to the spaces. The Welcoming Library was the best example of this issue: Hannah noted the “fear of the blank page,” and users were baffled at what they would do in the space without the hand-holding the programs provided. At times, especially in this library, the trust people had in their own abilities and dispositions blossomed through using the spaces. Often this trust in one’s own ability expanded through making together with others (e.g. Robin, Abby).

The imperceptibility of radical monopolies that Illich mentions was also visible in this research. The participants rarely questioned what the library offered in terms of tools or rules, or

consider that they had or should have any say in the matter. They were happy that the library allowed them to do anything, and they set a low bar on their approval of the library's offerings. This suggested that the participants had so *little* trust in the library being a relevant, technologically-savvy institution, that any 3D printer seemed like a sign of such relevance. It may be that the library users are happy enough with whatever bones the library throws them, because they expect no bones at all from the library, or are not concerned about it either way, because the library is not important enough for them to care about. Such people do not trust the library to be relevant to their own needs, as seen in some non-users in this case.

As Illich's concept of polarization suggests, some users believed the library staff would not allow particular uses of the spaces, resulting in distrust. They decided to avoid the library. Other users decided that the library staff were the experts, and trusted them. They accepted that the library had a radical monopoly on what was valuable and doable, and most participants did not express any glimmer of awareness that it could be otherwise. In this sense, the people trusted the library to know what was good for them, even when their own needs in the makerspaces did not jibe with the institutional framings of what the spaces were for. As Illich suggests, and this data reinforces, the conviviality of these tools requires a significant shift in trust, most notably in trust people have in their own abilities to make and to choose the things they value, rather than what the library says they should make and value. To that end, the Capability of Acting (rather than being acted-upon—which will be discussed further in this chapter) is key.

Uplift – Fun

The goals or ends that the public library creative places were assumed to support existed in tension between the largely institutional rhetoric of learning for the purposes of economic uplift—especially for marginalized populations—and the user desires to have fun and express themselves. This tension's codes capture the reasons, ends, or goals of the space or the activities within it. There can be significant overlap in the ends. For example, people described learning and having fun expressing themselves at the same time. This theme determines the "appropriate"

uses of the space, and the preferences one has for serious or casual leisure uses.

In the case of the small Welcoming Library, the institutional focus on creativity and expression co-existed alongside discourses about economic or educational purposes. The imaginaire that emerged in all three cases, to some degree, is that the creative places existed mostly to assist learning and career-friendly skill sets. Nearly every library worker and trustee agreed the spaces were intended for education. Manager Hannah said,

Before [libraries were] about literacy, now it's more about education and I think here [in the state] ... one of the things that they're promoting is, 'libraries are education' because they want the funding for libraries to be the same as schools. So they've really latched on to this word 'education.' We're trying, by having a Makerspace, to provide a diverse education for the community.

However, while Hannah was advocating a narrative of education, literacies, corporate partnerships, job training for developmentally delayed individuals, and school visits, she was also focused on having fun. Welcoming Library balanced the tension of **Uplift – Fun** by ensuring that users had some power in deciding what programs and tools were in the space. Still, it was clear that some tools fit more comfortably with the institutional rhetoric of innovation, rather than traditional artisanal skills, even though the programs with such artisanal skills appeared more energized, appreciated, and well-attended. For manager Hannah, laser cutters were welcome; spinning wheels were not. At one point, she bemoaned the community's reliance on and enjoyment of programs and workshops and wished they would come in alone for "real making" (fieldnotes 4/18).

This library, along with Responsive Library, was comfortable with the idea of play, creation for creation's sake, and fun. Nevertheless, when choosing equipment, Hannah leaned toward advanced, digital, and electronic types of tools. She was framing the space as instrumental for particular types of engagement. The imaginaire of uplift was prevalent throughout the narratives describing the spaces. Fun was seen as beneficial and desirable, but also more of a pleasant side effect than an end in itself, or it was the spoonful of sugar helping the medicine of learning go down.

In Responsive Library, all of the making in the space centered around either personal use, or gift-making. This runs counter to the innovation narratives of some makerspaces and some participants. In fact, none of the participants in either Welcoming Library and Responsive Library described their activities as making things to sell, except Aidan, an engineering student using the Responsive Library. However, while few participants described their activities in terms of economic gains by selling their creations, most discussed the economic savings they incurred by using the inexpensive or free services and tools the libraries provided. Some worried that people would create things to sell in the spaces, which would impinge on others' ability to access tools (staffer Olivia and director Richard, in this case).

However, narratives about makerspaces being for innovation, learning, prototyping, and developing work skills—so prevalent in Productive Library and Welcoming Library—faded away in Responsive Library. The director is a musician, the person who runs the space is an artist and married to an artist, some people on the advisory board and board of trustees are artists. Thus art, play, and the excitement of creation seem to be institutional goals of this space...until the library communicates with either funders or the general public. Then the rhetoric of the space shifts toward the more economically viable skills and STEM-based activities. At a city council meeting, Director Richard highlighted economics, job skills building, and innovation occurring in the space. In another example, the man in charge of the space, Justin, explained that a state economic development group had given the library a grant to pay for 3D printers (although they had already been purchased) and other STEM-based equipment. The grantors refused to pay for the kitchen equipment or other items that were less technologically “sexy.” In fact, that economic group never paid out the promised grant funds when I was in the space, much to the dismay of Richard and Justin, who had counted on those funds, and had spent based on their promise. This space was positioned for fun, creativity, play, expression, as well as learning and uplift. Yet even here, Justin expressed some visible discomfort with the idea that some community members wanted to socialize in Crafternoon programs instead of “leveling up” into more serious and individual use of the space.

In the Productive Library, users such as graphic designer Jordan spoke of privileging “real work” over gaming, the library staff prioritized certain activities as preferred and others as just “fun” and thus less important. The library staff compared the space in terms of what could be produced by individuals, versus what was actually done, and seemed sometimes disappointed by the users’ decisions. For example, staff member Colin spoke of:

“7 guys who come in every day” and “don’t use hardware, just software.” He said there were many thousands of dollars worth of software on the computers, including full AutoCAD suites, Adobe, everything someone could want to make things using a computer. Most of it, he said, was never used. Only Adobe was used.” (fieldnotes 5/9).

The tools and techniques that were used in the spaces were rarely the ones that might enable entrepreneurial innovation or prototyping. Instead, most people were using the tools that allowed them to capture already-existing models and ideas in physical form. Some users remixed and created original products as well.

Uplift through Changes in Disposition

Additionally, the spaces were intended to lift up particular populations within the community. In all three communities, children and people with socioeconomic advantages were presumed, by library staff and users alike, to be the primary beneficiaries of the spaces—even though those were rarely the people who used the spaces. Robin, who was a user and a librarian at the library system for the Welcoming Library, thought about who would find the makerspace useful:

We always think the businesses. Small businesses, entrepreneurs, people who want a prototype or set up or something...

I would love to see the members of any community that feel marginalized: teen mothers, people who are living in temporary housing. I feel like they could use the makerspace and gain confidence and skill or something like that.

This was a different “uplift” imaginaire. Instead of gaining 21st century skills, she emphasized a new disposition or sense of self. She had found herself changed by her interactions with power tools in the space, and extrapolated that others could benefit from such a change. Other users

concurred. While participants in Welcoming Library, such as fiber artist Linda and Robin extolled the fun and happiness they found in making, they also spoke of the shifts in themselves and others that occurred through an liberatory engagement with the material world, and with others.

Shadow Work

In Productive Library, what mattered in the space depended on who was speaking. The library staff, who had the final say on what was allowed to occur in the space, said that the space was primarily for learning, innovating, and skill-building, not making per se. Though making and even play were important, they were instrumental for more important things—things that could make someone money (staff members Jenna, Colin).

Rose, the older woman using the space, fell outside the discourse of why and for whom the space was intended. “These guys know me,” Rose said, gesturing at the library staff. It was true. She was a regular user, and many of the staff members were aware of her anti-litter campaign (Nick, Jenna, Colin). However, Rose’s work remained invisible, marginal, or unimportant to the staff. Activities important enough to highlight on the evening news in an event with the mayor of a large city—Rose’s makerspace-supported grassroots campaign to clean up her neighborhood—were not visible to most of the makerspace staff. The discourse of the space as entrepreneurial and educational overshadowed alternate discourses. Illich discusses the shadow-casting rhetorics of overprogramming and radical monopolies in his book *Shadow Work* (1981). He describes the ways in which unpaid work that supports capitalist economic models, such as housework, community building, relationship strengthening, and often feminine labor, goes unnoticed and unappreciated. Such work was cast in the shadow of paid labor’s glow.

One could look at Rose’s activities and obvious success in attaining her goals, and see a clear support of her power by the library (until the library limited her access). One could also listen to Rose discuss how she felt about the space, and hear her sense of struggle against powerlessness. Rose’s use of the space and tools was quite different from that the staff assumed to

be occurring. She did not fit the institutional or even many of the individual framings of the space. Most study participants assumed that entrepreneurial, innovative, and learning tasks would predominate in the spaces. However, Rose already knew much of what she needed to know to do her anti-litter campaign, and to make pillows and t-shirts. She knew how to use computer design software, for example. Her primary reason for using the space was not to learn. She was not entrepreneurial in a commercial sense. Rather, she sought to express herself and to build her relationships and community. Rose was innovating and creative, but not for monetary gain or career reasons. Instead, she was caring for the people and world around her through her use of the creative place, as well as pursuing a hobby that was meaningful for her. She was a Maker more than she was a Learner. She was engaged in shadow work, barely visible in the glare of uplift rhetorics in the space.

Which tools?

In Productive Library, there were not always enough tools to meet the need of the community, or there were too many of certain tools but not of others. The five 3D printers sat largely idle, but users booked the vinyl cutter/printer and laser etcher for six weeks in advance. The \$16,000 vinyl machine was by far the most desirable tool, with users struggling to find open time to use it. People used a myriad of tactics to get access if the person who had reserved it did not show up. Since many people forgot their reservations, the machine often went unused for fifteen-minute waiting periods while the staff resisted the entreaties of the users to “just hop on it for a moment” (user Anna).

If the library had purchased fewer of the often-unused 3D printers, the library could have afforded another vinyl printer. However, the team leader Jenna said the administration wanted 3D printers instead of another vinyl printer/cutter because it was “not as educational...it’s just a giant printer” (fieldnotes 5/20). She also noted that the library did not want to compete with local printing businesses, since the library only charged \$4 a linear foot for printing banners. The library was prioritizing equipment purchases based on “education” rather than utility. And the

library wanted users to continue supporting local businesses instead of doing their business more cheaply in the library.

This careful negotiation of what the space was and was not for acted as a limit on users' decision making about how they wanted to use the spaces. Jenna and library administrators Sheila and Janet pointed out that the library was not intended to be a printing space, but a learning space. Making was a distant second in importance to learning about making. In addition, expensive equipment required expensive upkeep. In the Productive Library, the Espresso Book Binding machine cost nearly \$200,000 and its monthly service fees were crippling to the point that the library was canceling their service agreement. Yet the machine broke down constantly, requiring many hours of staff time to keep it running. The library was prepared to walk away from the machine if they could not fix it, since the maintenance costs were so high (staff members Martin, Chuck). Despite the community's interest in this tool, for the library it was becoming more trouble than it was worth. The staff at this library did not wish to cut important tools or materials, but had no set budget. They never knew when they had funds to continue operating, or when those funds would vanish. Similarly, the economic development corporation who had promised the \$20,000 grant in Responsive Library wanted to fund more 3D printers, not a kitchen. Although the community had food insecurity needs, and cooking clubs had met in the library for years, the refusal to fund the less technologically appealing types of making limited the utility of the space.

Why make?

Nearly all the materials made in all three of the spaces, by both the users who were interviewed, as well as those observed or spoken about, were created as gifts. Most of the exceptions to this rule involved users making tools to support their own creative activities (stencils, photography peripherals, frames, tools). Few participants described using the creative place for their own economic gain by selling their creations. In the Productive Library the five exceptions included four men (fashion designer Sabian, musicians Perry and Isaiah, and graphic

designer Jordan). Another entrepreneurially-minded user was a young woman (Felicia), who sold her buttons on Etsy.

Those participants nevertheless focused more on the desire for fun and self-expression as a primary motivation for using the space, and economic gain as secondary (Sabian, Isaiah, Jordan). Every other user described their own activities as a way to have fun and share rather than instrumental for careers and economic gain, although many saw the funding of the space by tax dollars as a path to that skill-building for others less fortunate than themselves. This was different from the Welcoming and Responsive Libraries, where only an engineering student in Responsive indicated wanting to make items for sale.

Most of the library staff viewed the space as uplifting in exactly the other way around: The desire for expression and play was secondary to and instrumental in creating opportunities for economic gain and skill-building. Fun was great, but it was not the point. Users' practices of gift-giving, play, and self-expression were replaced with narratives regarding economic benefits that users nearly always described as accruing to others, those who needed help, improving, or uplift. Some participants described the cost savings in sharing tools at the library as for their own economic benefit. But learning technical skills specifically as a path toward economic and social mobility, was for other people, less fortunate than they were—and that is what these spaces were “really” for, and what the users were expected to do.

A “student” mentality and power relationship appeared to be internalized by some participants. For example, when two older women working on birdhouses in the Welcoming Library space called themselves “students” (fieldnotes 4/27), this positionality relative to the person leading their workshop was embodied when he took over their projects. They just watched him work. The birdhouses were not a collaboration or even active learning, but became a male expert demonstrating steps in building one. These women, and most users I spoke with, seemed fine with that. They expected to be subservient to the agency of the library actors (including volunteers leading workshops). Most did not quibble about being told what to do or what was not allowed. They did not see themselves as in charge of the outcomes or ends to which

they intended to use the space, nor even the means by which they could act, but and some seemed comfortable with their subservient role as student or learner. Illich (1973) describes the concept of overprogramming as a way of ensuring that people are objects acted upon by the institutions that are supposed to be serving them: “Overprogramming can transform the world into a treatment ward in which people are constantly taught, socialized, normalized, tested, and reformed” (p. 76). It may be that Illich’s concept of overprogramming is at the root of this finding.

The Maker Audience

Some kinds of creators were centered as the main audience for the makerspaces. As Responsive library director Richard said when I asked him what the makerspace was for, “It’s like, here’s an opportunity to come in, take your time, learn what a 3D printer is, learn about it and maybe there is value in it. You want to go buy one... The library funds it. You can come in and use it and decide if this is something that you want to incorporate in your life.” These users were expected to be independent, and self-starting. Justin was a long-time maker and the person in charge of the space, and struggled slightly with the program-dependent recreational maker. “They are a different crowd entirely,” he said (fieldnotes 8/4). Justin valued play for its own sake, but appeared dismissive of the crafting programs preferred by many community members over at-will, self-directed makerspace activities. Welcoming Library manager Hannah valued play and self-expression but centered her makerspace on 21st century skill-building for job development purposes. She wished people in her space would escape the program and workshop mentality and begin to use the space for “real” making. Productive Library team leader Jenna spoke of the value of play on one hand, but then emphasized that the space was really for learning. People in all three libraries were expected to leave behind the programmed or recreational uses of the space in structured programs and become independent, self-directed makers focused on innovation. When I spoke to more casual users, their goals were different. The people attending programs welcomed social opportunities to learn and make, but may never pursue the activity they learned

further. Rather they wanted to just have some light fun.

The casual makers at programs wanted a successful object to take home and display, gift, or use. But the more independent makers were as interested in process as product, and were happy to build skills to develop their interests. I had not seen this two-audience problem in the other libraries, perhaps because they each were attended primarily by the different audiences: program-dependent users at programs in Welcoming Library, more independent users figuring out things on their own in the Productive Library. Responsive Library's culture was the first I saw that was balancing the needs of both groups. This library straddled these two groups by ensuring both types of making were supported through regular programs and workshops, as well as the at-will self-initiated making that filled the space most days.

Yet there was little overlap between the program-dependent and independent users. It was assumed by the staff in this space—and in the other libraries—that playful engagement with the tools and programs would inspire more independent individual use. In Welcoming Library, manager Hannah hoped to slow and stop programs as an imagined independent audience began to use the space. In Productive, everyone was presumed to be independent, with some comments about people “playing” on the button-making equipment somehow moving into more “serious” uses of the space (team leader Jenna). Justin, the technology director in Responsive Library, wanted program attendees to “level up” their making until they no longer “needed” programs (fieldnotes 8/4). Yet in my three months in the Responsive space, I saw two people move from the programming-based interaction to an independent use of the space (Sylvie and Chloe, both sewists).

The programs and at-will makerspace uses appeared to serve distinct community needs, with some overlap in terms of enjoyment and self-expression. Despite some library actors' dismissals of the programmed recreational uses of the creative places, such uses were desired by numerous people in the community (e.g. Virginia, Abby, Colleen in Welcoming Library; Tessa and Laney in the Responsive Library). In Productive Library, where almost no programs occurred, study participants such as Melissa, Tanya, and Anna all mentioned wishing there were

fun programs in the space for them to enjoy. Notably, all these participants are women, suggesting that perhaps the “recreational” and “serious” uses of the space may align with gender. More study is needed to follow up this suggestion.

The Capability of Choosing (One’s Means and Ends)

In the category of **Uplift -Fun**, the data revealed that acting as the agent in charge of one’s own work was linked to an important expression of that agency: the capability of using the tools, spaces, and one’s own resources in a manner and for a purpose one chooses. In other words, the people in the spaces needed the Capability of Choosing the ends to which they put their efforts, and the means by which they accomplished those ends. This need rose to the surface as a primary capability in ensuring users could use the tools as they needed to, for reasons that may or may not align with institutional objectives. This is the definition of a convivial tool, after all—a tool that is designed and maintained so that the power to choose what to do with it, how and when to do it, and the reasons for its use are forwarded to the user. These reasons and imaginaires of the makerspaces were contested between users and the libraries. The reasons then impacted the possibilities of the spaces.

People in these libraries wanted to play and create for the sake of creating, as well as to learn. They wanted to self-actualize in ways that were meaningful to them, which often involved playful, recreational use of structured programs in the space, or dropping into the space to participate in a pre-generated craft. These library spaces, despite some of the institutional narratives and user desires, are not *for* playful self-expression or recreation. While play and fun are often described relative to these spaces, that play is intended to be instrumental for institutional goals of learning and economic uplift. This entails an appropriation of user desires by institutional goals. Such appropriation is visible in the so-called empowerment of the spaces in this study, when it is limited to economic empowerment, for purposes that fit into neoliberal discourses about individuals picking themselves up by their own bootstraps, and re-skilling as an

individual's responsibility.²⁹ For these spaces to be convivial tools for their users, they need to be usable for ends the users themselves decide. At the time of this study, these libraries were, to a greater or lesser extent, appropriating the user's agency to use the makerspaces for the reasons they determine themselves, in name of larger social goals such as learning and economic uplift.

Subject – Object

This tension reflected the position of the user, from actor to acted-upon, in relation to the library institution. The terms *subject* and *object* are used in the grammatical sense, in which the *subject* acts upon the *object* in a sentence. Thus this tension explores the relationship between users and their tools. It describes the warrants and limits of user agency, their power to make decisions regarding their own use of the spaces or what is possible for others. It also describes the help that is offered to users, and when that help veers into the realm of “control.” Some of that control or lack of agency means that users must accept a limited range of contingencies or outcomes in their use of the library makerspaces. Furthermore, it discusses the democratization of making, based on the oft-repeated makerspace trope that not only everyone can do things that they had neither the skills nor the tools to do previously, but that the spaces are run in the spirit of democracy, with each person having a say in what occurs there.

Each library, even Responsive Library, kept the ball of power in their own court through what Illich (1973) calls overprogramming and radical monopolies. He offers a remedy for overprogramming, called active mastery:

An individual relates himself in action to his society through the use of tools that he actively masters, or by which he is passively acted upon. To the degree that he masters his tools, he can invest the world with his meaning; to the degree that he is mastered by his tools, the shape of the tool determines his own selfimage [*sic*].
(p. 34)

Being the agent in control of own's making or activity involves being able to use the tool to attain

²⁹ This finding is complicated by the fact that the libraries are governmental agencies providing access to shared tools and knowledge—which deviates from neoliberal preferences for the market to take care of such things, instead of governmental agencies. Greene (2021) states that public funding for this access is intended as a temporary safety net in acknowledgement that digital divides have been too swiftly developed, vast, and complex to be addressed through market-only means.

a goal, and involves a sense of self and one's place in society, of one's ability to shape that self and place, and the ability to shape the tools. Various forms of active mastery (usually labeled "democratization") are discussed in relation to making and makerspaces, suggesting that people taking ownership and control over technology. Such shifts are visible in these spaces to the extent that several participants in this study identified this sort of new relationship. For those participants, their new relationship to technology felt liberatory, or in Robin's term, "empowering." Robin and other participants related a new relationship with technology—that of subject-acting rather than an acted-upon object. They described a form of active mastery, which often delighted them. Those participants felt more in control of the technology they understood.

As with all the tensions identified in this study, the tension of **Subject - Object** exemplifies flip sides of the same coin. Users of the spaces also benefitted from being acted upon by the library, they said, and it allowed them to be the subject of some future that was valuable to them, involving better skills, more knowledge, greater social connections, and the joy of making. However, self-actualization, active mastery, and expressing one's "meaning in action" (Illich, 1973, p. 35), each emanate from a sense of doing things oneself. Many makerspace users described desiring such active mastery, often while saying they were also happy with the library making decisions for them (e.g. Welcoming Library users Linda, Jerry, Reuben).

Manager Hannah focused on this point several times in the month I spent at Welcoming Library, and this was brought up in the other cases as well (e.g. Responsive trustees Erika and Laney, Productive team leader Jenna, Productive user Beth). Hannah spoke of "forcibly awaken[ing]" some teens she perceived as "deadened" to creativity, and how her space and programs offered people a path back to creativity that she felt had been extinguished in them. In this, she was the active master—the one acting and able to decide how to act upon her patrons. She meant to help, not force or coerce people back onto a path of creativity that she felt they had veered away from. Still, her understanding of the teens' creative needs might not align with their own. Few teens participated in the programs, though that may have been due to other factors, such as the limited space available in the programs.

The creative places were often presented as democratizing spaces intended to ensure that all people could make. The democratization of making did exist—all sorts of people could and did make, thanks to the shared tools and knowledge in these spaces. Yet this democratization often meant that all people had equal responsibility to figure the spaces out and negotiate what was possible only in terms of their own individual needs. These participants were often what Sangüesa (2013) defines as “subjugated participants” in the context of makerspaces:

A subjugated participant can expect, at most, to play the role of a learner or of a receiver, while a producer/manufacturer/designer can achieve the status of *strategic participant* and have his or her say in decision making.” (p. 6, emphasis in original)

In this study, participants had some power over their own use of the tools, but this control was skin-deep in some instances—as when Welcoming Library held a four-week 3D printing class that never allowed users to touch the printer. They had some ability to be strategic participants, as Sangüesa terms it, although Productive Library in particular placed so many barriers to volunteering, socializing, or enriching the community, that the library alienated some makers (Sean, Rose). The ability to act as an expert or have a say was negotiated more fully in the Responsive Library, with its persistent work with its Advisory Board, even if the board could not make substantive decisions. In addition, the constant invitation to people to share knowledge informally through socializing, and formally through leading workshops, meant that users in that library were given some decision-making and participatory power.

Decision-making

In terms of user governance or decision-making in the space, it may be as community organization leader Lisa suggested, regarding seniors who were unlikely to understand the Welcoming Library space:

These people were raised believing that you go to a library to get a book and you don’t talk while you are there. That’s all they know about a library.

The participants in all three cases accepted the library’s framing and implementation of the spaces on the library’s terms. If they did not see what they wanted to do as possible in the spaces,

they simply left, with little sense that they might take an active role in making the tool more convivial. They were satisfied to be objects. For example, in Welcoming Library, fiber art program attendee Vivian said she wanted certain classes, yet would not request them herself. She would wait for them to be offered to her.

The people designing the spaces said they wanted users to occupy the driver's seat more often. These library workers wanted their patrons to take over their own sentences—to be in control over what they wanted to make and how they wanted to make it. As the Welcoming marketing materials said, “What do YOU want to create? You dream up the ideas...We'll help you bring them to life!” (ellipses in original, “Everyone is an Inventor”). The library would help them make their dreams and goals a reality, as and when such help was needed. As in Responsive Library, that help was proactively offered, to ensure intellectual and sociocultural access.

The Productive Library also staff wanted the makerspace to self-populate with competent, knowledgeable makers, each focused on their own projects. Help was not always proactively offered in this space. Instead, every person was to be the subject of their own sentences, in charge of, and responsible for, their own making, up to the limits determined by the library. It was unclear how users were expected to become competent and knowledgeable, aside from using the Lynda.com database to access how-to videos. Lynda.com were the bootstraps by which people were supposed to pick themselves up. Since little formal training occurred in the Productive Library space—either for the staff or the users—it became apparent that this organization described shared or social learning as valuable in its discourses, but offered little structured opportunity for it to occur in its practices. Staff members helped users with the basics of using the tools, when users asked for help. Some staff members looked for confusion, so they could assist. For the most part, the staff did not intend or have the ability to intensively teach or help. At times they helped up to a certain arbitrary —from the perspective of the patron—point, and then directed the user to resources where they may learn more. Other times, a staff member would spend a great deal of effort assisting someone. But usually, the users and staff of this space had to be self-starters, eager to learn on their own, or already expert makers. Few entry points

were offered by the organization for beginners or those ignorant of how or why to use the space or its tools. The limits on help were in part due to the constraints on staff time and resources. They were also due to an institutional decision that the creative place users were responsible for their own learning and their own projects.

In Productive Library, the staff did not expect or inculcate a community of makers that could teach one another, even though they positioned learning as the uplifting reason for which this space existed. In the other libraries, users were expected to teach one another. This occurred regularly in the Responsive Library. In Welcoming Library, manager Hannah said, “You don’t need a tutor who’s an expert in Lego robotics because it should be teaching both ways, which is the philosophy behind the Makerspace to begin with.” She and assistant manager Sue spoke passionately about the value of users sharing knowledge informally. This occurred within the contexts of the making programs, between the volunteers that led the programs, and the participants helping one another.

Illich (1973) said when tools are not convivial, the actor is acted upon (p. 34). In Productive Library, the users were usually the subjects acting and not the objects being acted upon—while they made things. At all other times, the users were not consulted on programs, equipment options, policies, or procedures. Even when planning the space’s implementation, the library did not ask the intended users of the space what they wanted, but asked other librarians offering makerspaces (Janet, Sheila, Chuck, Jenna). In all respects other than their individual projects, the users were the objects of institutional goals and narratives—they were “acted upon.” Users had few rights, but many responsibilities.

Limiting the Range of Contingencies

In Productive Library, photographer Marla’s story of printing nudes, told from her perspective and that of team leader Jenna, highlighted two different aspects of what the library staff did in the creative place: helping and controlling. Marla felt as though Jenna was controlling her use of the space, limiting it, and judging it. Jenna felt she was helping Marla do the work she

wanted to do and to use the tools in a way that also respected the communal nature of the space. Each was mapping their own concerns onto the behavior of the other. This was a regular theme in this library. A lack of communication or awareness of the goals of each person involved meant that often the help the library staff offered either was perceived as control or veered into the territory of control. In this instance, Jenna was trying to limit the contingency of other users placing barriers on Marla's use of the library. In other instances, failure became the contingency that was unacceptable. Library staff "taking over" projects was a regular occurrence in Productive Library. Some staff who were taking over were responding to a certain degree of helplessness evinced by patrons. Occasionally patrons floundered, and sought out help at every step. Some appeared afraid to touch anything for fear of breaking the library's equipment or of wrecking their project.

The Productive Library staff sought to reduce the possible contingencies of each activity based on institutional or personal goals and values. They favored what they considered "success" in projects rather than learning from failure. They limited failure whenever possible, and also tended to intervene in social interactions to keep any sorts of negative altercations from occurring. This kept friction from sharing equipment and space to a minimum. This also prevented some positive or helpful interactions.

Such limitations were in clear contrast to Responsive Library. The staff here excelled at helping the bare minimum, and ensuring people took ownership of their projects. Teen user Jack described the Responsive Library staff's helpfulness:

I mean like if something's wrong with the MakerBot, they'll come over. They'll show me what's wrong. They'll fix it and then... They talk me through it, yeah, because you want to learn like sometimes like they'll be busy and then you can learn how to fix it yourself kind of thing. I mean it's a do it yourself area. Like they're trying to teach you how to do it yourself.

In Responsive Library *help* rarely veered into *control*, as I had seen in the Productive Library. Here, people in the room tended to support one another, whether they were staff or library users. While occasionally help in these spaces began as *showing*, but swiftly became *doing for*, this rarely

occurred in the Responsive Library.

Unlike the other libraries, the Responsive Library had many written procedures about how to properly use tools, which were noted in user agreements and badging materials. They had extensive guidelines for correctly instructing people on the use of the tools. And the library had many overall rules that impacted the use of the space, especially for children. Longtime maker Justin, in charge of that space, determined that makerspace rules would emerge as needed, to control the most problematic conflicts. This library offered the widest range of making, both in terms of medium and method. They gradually added rules to enhance sharing, trying to limit any reduction of the conviviality of the space, or the possible contingencies of what occurred there.

Meanwhile, in Welcoming Library, contingencies were limited by the structure of the workshops and classes. Users in this space made what was “on the menu,” for a given event, whether that was a birdhouse or an Arduino-controlled machine. Moreover, the leaders of some of these events controlled what was possible in them in other ways: 3D printing teacher Travis decided users would not be able to use the printers hands-on themselves, and woodworking expert Julian took over Yolanda and Colleen’s birdhouse projects so they would be “successful.” Though the users could access the space on their own, and likely would have been allowed to “fail,” since manager Hannah described the benefits of failure, they did not do so. They were satisfied with their limited agency, and whatever the library offered to them.

Controlling Information

Control over information was used as a way to minimize, corral, or expand user power. In Productive Library, the methods for acquiring special dispensation to use tools longer were kept secret, or at least not regularly disseminated. For example, even I, whose job it was to ask questions about the policies and practices in the space, did not become aware that one could extend computer or tool time by asking, until the end of my stay in this library. In some regards this appeared deliberate, as when the technology director Chuck described using the time limits imposed on tool use to get around intellectual freedom issues (i.e. 3D printing guns or sex toys—

any of which would take FAR longer to print than policy allowed). The restriction of knowledge about the flexibility of the rules was thus a tool of control for institutionally-frowned-upon activities—or people.

The obfuscation of the possibilities for flexibility in the rules of the Productive space were highlighted by some staff members. Those who felt frustrated with the restrictions imposed on users advocated for the patrons' need to know about this flexibility (staff Nick, Liam). Even so, these staff members saw the value of control over information to head off confrontations or problems between users or between users and the library. For example, Nick, the staff member in the midst of earning an MLIS, talked about the problem with extending computer time:

People take a little too much advantage of it. You still have people who will be there for hours. There is a woman who started like at 11 and she wouldn't leave until four, so that means that she had 1, 2, 3, 4, 5, something like six or seven extensions... There are a couple patrons that have come in and used it as their private office. And well, we can't... We don't want that behavior to be going on.

Thus, some staff members never offered extensions, and others did situationally. In this library, the role of conversation between staff and users was complicated by different understandings of what “help” meant. How much information or expertise a patron had often determined—or was mediated by—how helpful a staff member was able or willing to be. With nearly all the policies and procedures that shaped the use of the space and tools unwritten, as in Productive Library, the variability of staff decisions was striking. The other two libraries were less variable.

Convivial Power Relations?

Most users of these spaces, and nearly every library worker³⁰ expressed some version of convivial tool thinking regarding what was possible. It was possible for anyone to do anything in the space, they claimed. Only through questions inquiring about what people are NOT able to do, did some participants begin to see limits on the conviviality of the tool. Productive Library team leader Jenna said at the beginning of my time in this library that the space was “full of

³⁰ Responsive Library technology director Justin was the sole exception. He was clear from the beginning of our conversations that there were some activities that were not possible due to rules, sharing spaces with the rest of the library, and limited staff resources.

possibilities, people can make whatever they want here, really” (fieldnotes 5/4). Toward the end of my stay, after many probing questions about what people could or could not do and why, Jenna responded to the question of what she would do if she had a magic wand in the space, saying, “I would really like it if everybody who walked into the Makerspace knew what exactly we can help them with and what we cannot help them with. The expectation versus reality thing” (interview, 5/29). She shifted from framing the space as convivial to a much more limited offering, describing a limited scope of offerings and opportunities.

Similarly, Sean, a former member of a private makerspace, initially positioned the Productive space as convivial, but over the course of a few weeks not only stopped seeing it as convivial tool but regularly came to me to report new limits he had discovered. At one point he said:

I can’t believe I thought this space was so great, I guess I was just overwhelmed by how great it was to have free access to all this equipment, when I used to have to pay so much... Really you can’t do much here. The tools are here, but the rules get in the way. (fieldnotes 5/20)

He identified staff practices of control, time limits, and lack of a social making culture as serious limits on the conviviality of the space.

Volunteering and Shared Governance

The making and makerspace literature discussed the desirability of giving back to the making community, through volunteering, peer teaching, and active decision-making is desirable. Similarly, Illich (1973) believes that active mastery requires people to have control over the tools they use, lest *they* become the tool of some institutional mandate. Still, there was little evidence of such volunteering or decision-making power in the Productive Library. Decision-making power was also limited in the other two libraries, though significant volunteerism occurred in those spaces.

In Productive Library, institutional barriers to volunteer efforts were twofold. First of all, the process of background checks and applications to be a volunteer in that library were

extensive, expensive, and had to be paid for by the volunteers. Second, the library staff in charge of the space did not encourage volunteer efforts to share or demonstrate their making. While many users (such as Kent, Hunter, Sean, Rose, Dana, and Rob) said they would appreciate either volunteering or participating in informal volunteer-lead workshops, technology director Chuck dismissed such ideas as both unworkable and unnecessary. Team leader Jenna was willing to consider having volunteers, but felt overwhelmed by the steps to accomplish any structured volunteer effort in light of bureaucratic barriers and skeptical that it would work in any case. She was certain no one would attend programs, which did appear to be the case in this library. The culture of this library seemed to preclude volunteer efforts. Users were not encouraged to be the subject of teaching or sharing activities—the teachers—but were the objects of learning efforts—the learners. This placed all the users, even the most expert, in a docile and receptive position relative to the authority and decision-making power of the library institution.

Children

Before I began this study I would have predicted that some adults would be interested in being the active agents in deciding, if not how the creative places ran and what was allowed there, how their own making could proceed. However, as shown above, this was not always the case. One might also have expected children to be the more or less passive objects of adult planning and programming. This did occur.

Yet one of the things Responsive Library excelled at was not distinguishing between the importance of work being done by a child versus that being done by an adult. In part, this reflected the library's embrace of art, play, and messing around, as opposed to making that was instrumental for some economic or educational gain. As young power user Tyler said, "It's a place I really go to do something... relax and I might even, you know, use my knowledge without having to get, you know, beaten by a lot of old people." He was relieved and gratified that in this one place he did not have to give way before the needs of adults.

In this library, children were the subjects of their own sentences to some degree—they

decided what they wanted to do, and were encouraged to do it. Yet, they, like the other users, were also objects of policies and practices that they could not control. Any child interested in using the space had to convince the adults in their lives to ring them to the library, and to sit in the space for the hours required to make something. Dylan, Chloe, and Tyler all described challenges with this requirement. Yet it never occurred to ten-year old Claire, for example, to object to the rules. She was the object of policies, programming, and other people's decisions. This was perhaps due to her youth, but also perhaps due to her role relative to the policy-makers, the library staff.

After all, adult makers such as Roger and Wyatt also struggled with feeling like they were objects of control, while the library administration were the subjects with agency, deciding what would happen in the space, and what would not. Wyatt felt like he were being treated like a child when he described the “toddler’s choices” the Advisory Council was offered by those truly in charge, the library administrators. Yet he never complained to the library about this feeling. Roger noted that he had little say in what occurred in the space, but felt he did not need to have a say as long as the library was doing a good job of ensuring the space was as convivial as possible. Even Richard and Justin, the administrators in charge of the space, struggled at times with feeling like they were under the control of forces greater than themselves: trustees, politicians, and the public at large.

The Capability of Acting (Rather than Being Acted Upon)

As discussed in the section on **Trust – Doubt**, one aspect of social trust involves believing that the user has something to offer, that they are a capable agent able to be in charge. This capability expands on that, to describe how users can make the environment better, rather than only accepting whatever the library extends to them. Yet there is some question as to whether the users of these spaces the subjects are determining their own destinies, or are objects of institutional programming. In most cases, they are both. The **Subject – Object** findings describe some of the tensions and overlaps in positionality users and other stakeholders found themselves

occupying. This was one of the most crucial findings of this study.

Illich (1973) points out that “Man's ability to claim his rights is extinguished by his bondage to processes over which he has no say.” (p. 92). Often the community had little say in what occurred within the public library makerspaces. Sometimes users were offered banal decision-making power or individual choices, but little governance or community-wide impact. In the meantime, they were often expected to take on all or most of the responsibility for their own understanding, making, and learning, especially in Productive Library. At times, people using the creative places were objects being acted upon by the library's interests rather than the subjects acting on their own behalf, according to their own values and needs.

Acting, or expressing one's own agency in these spaces, involved three main sub-capabilities, each of which involves an individual's relative position as the subject-acting or object-acted-upon in the space:

- the first sub-capability is to have some type of say in what occurred in these spaces, or some form of shared governance options;
- the second sub-capability is to be able to give of one's own expertise in the spaces, though peer-learning, workshops, or other formal or informal processes, and which is explored further in the Capability of Coexisting and Forming Relationships;
- and the third sub-capability is to balance needed help and institutional control and the range of contingencies possible in the spaces, for example so that failure is an acceptable contingency if it meets the need of the individual.

The first sub-capability was not particularly visible in this study. Most users saw little need for or value in opportunities to hold any sort of governing power in the spaces. Many participants in this study had little interest in sharing governance of the spaces. Those who DID wish for this sub-capability, valued it so highly that they ceased much of their interaction with the space when it was not afforded them, like Responsive Library's advisory board member Wyatt. He never used the space he had spent three years helping to develop.

Similarly, few participants felt the need for the second sub-capability to teach workshops, or share their knowledge in a formal or structured way. Yet those that did so expressed a deep personal satisfaction from doing so (such as Travis in the Welcoming Library). Most of the participants were satisfied with whatever the library offered to them. Those who did wish to give

back to the space and the people in it, through shared governance or sharing knowledge, were those who had been active in other making communities, such as Roger, Sean, Wyatt and Rose. For them, this was a crucial part of interacting in the spaces.

The last of these sub-capabilities was most visible across all three spaces. The library actors wished to help. They were uniformly kind and giving, even when pressed for time and poorly supported by their institution. They also wanted to control the possible contingencies or outcomes in the space, whether they involved “successful” projects or avoiding danger or uncomfortable social interactions. But another form of control centered on the avoidance of “failure,” as defined by the library worker. Although staff rhetorically lauded “failure” as a necessary and important step in making, in general, they appeared to define success and failure of any given project as opposing contingencies. For most staff, failure was a contingency to be avoided. For example, despite the Productive Library’s stance that the space was for learning, often staff intervention aimed at reducing “failure” meant users felt they did not learn how to use the tools. Staff focus on “successful” projects as the reason people used the space had the effect of erasing user agency. Many users DID come to the library creative places to learn, not simply to have a “successful” project. These users defined a “failed” project as a step toward active mastery. That said, other users were grateful for help or even for staff taking over, because they wanted a successful project as well (e.g. Welcoming Library user Abby, Responsive Library user Fred). Some staff were more comfortable than others with learning, failure, and user-centered decision-making.

The potential for active mastery in the libraries was limited in part due to “conviviality masks.” Taylor (2004) described conviviality masks in their study of pantomime practices, as a form of “power-washing,” or providing a thin veneer of power-sharing whitewashed over a set of practices that do not in fact share power. These masks were, “simply creating another set of power relationships and social orders that, during the moment of involvement, appear to allow free rein to individual expression” (“Conviviality”, para. 2). In this study, the discourses and practices of power from user and institutional perspectives reveal an institutional “conviviality

mask.” The institutional stakeholders wanted to believe, and for their communities to believe, that anything could be accomplished by anyone in the spaces, as the makers choose, centered around the user’s own agency. In most cases, this was a conviviality mask; the institution retained nearly all power. The agency the users enjoyed was largely binary. Users could fit into the library’s idea of a makerspace, and *take* it. Or they could not—and *leave* it.

The conviviality mask rarely slipped: Almost every participant stated, in the abstract, that the spaces were convivial tools. Users and library actors alike stated that these makerspaces were tools that forward power to the user the power to decide how, when and for which purposes they were used. However, when library workers ruminated on the practices in the space, they revealed their need to retain power as control. Their framings of the space’s value revealed preferences for some groups’ power to the detriment of others, and their own doubts about the spaces and their users. At the same time, the workers battled their own institutions and their own fears, to try and make the spaces as convivial as they could conceive. These were almost always generous, kind, and thoughtful library workers. Sometimes they had to battle against the weight of their own institutions and bureaucracies, or their own professional identities, to try to make the spaces more convivial, as staff members Nick and Liam did in Productive Library, and Justin did in Responsive Library. Some library workers were aware that their own communities would limit the conviviality of the creative places, and strove to avoid those limits through acts of resistance, as Jenna did when she blocked other patrons from seeing Marla’s nude photographs. Another good example of this occurred in the Responsive Library, when staff members refused to check the age of some makerspace users for fear that they would have to forbid the use of the space to a precocious maker.

And the conviviality masks rarely slipped for users. People often framed the benefits and uses of the creative place as something entirely different from what they were doing. When a participant’s *own* making was not about learning or other goals that they could align with what they thought they knew of libraries, they reverted to saying that the true importance of the space was for *other* people to learn, even though they themselves just wanted to play, express

themselves, or socialize. Users would detail the things they could not do in the spaces, yet still state that they were open for anyone to do anything. Few people noticed the disconnect between their different perceptions of what was possible and desirable in the spaces, as when Fred and Sean each saw the space initially as convivial, then noticed the limits on use and reframed the space as good for learning and some uses, and their agency restricted to what the library allowed. Even fewer participants tried to realign the library faith imaginaire or hidden curriculum to what they wanted to do. Instead, they fit themselves to the tool, becoming objects to be acted upon by the library. Only exceptionally critical participants like makers Rose tried to shift what libraries could be, so the new version of the library could meet their perceived needs or values for the community. Nevertheless, this capability was so important to some users that it rose to the level of a necessity for these few (e.g. Rose, Roger, Wyatt, Sean).

Communal – Individual

Illich says a convivial tool is achieved through (and not just despite) interdependence. This was visible in the tensions of **Communal - Individual** interests in each library. This tension emerged from the fact that these were shared spaces, with shared tools, utilizing at least in part shared tax dollars. The tension also encapsulates the problems and benefits related to sharing, the desire for social connections, or fact that the spaces can afford valued social connections, and how the interdependence in the spaces impacted individuals or communal use. The tension includes discussions about social capital, community, or social networks. Tensions in sharing were evident. Communal resources were at times contested. However, to have any access at all to the creative places and their possibilities, individuals benefitted from sharing and interdependence. At the same time, individual uses and needs of the spaces were sometimes problematic when compared to the need for sharing.

In the Welcoming Library, where all use of the space was through programs, many community members had no meaningful access to the space if they were not able to reserve a spot in the participant-limited programs. The regular users of the space and those who were

watching out for new programs were able to use the space, but lengthy waiting lists revealed problems with sharing.³¹ Limited resources, particularly staff resources, meant that some individuals benefitted in reality, with the rest of the community's benefit only existing as potential. People in Welcoming Library did not need to negotiate access to shared equipment, through the sorts of turn-taking strategies visible in the other libraries. Instead, the makerspace itself became unusable to individuals when programs were held, and no one but authorized participants were allowed inside.

In the Responsive Library, the relational equity that Illich calls for was present, aside from some “toddler’s choices” (as Wyatt termed what was allowed the makerspace Advisory Council) and a lack of true shared governance. But this interdependence was a double-edged sword. It assisted people in feeling comfortable, learning, connecting, having fun, and succeeding with challenging projects. But the social connections and interdependence that made the space possible, through tax revenues and grants, also acted as a barrier to individual goals and practices, such as creating certain kinds of art or products.

“Adult” Making

In Responsive, staff and community members expressed concerns about “adult” or “rule-breaking” activities in the makerspace, and worried that activities involving making sex toys, curse-word infused music, or “naughty” embroidery would cause the fun to stop for everyone. Yet, as I looked upon all the making in the space, during ANY program or making activity, the only making I saw that involved “adult” language or imagery was Roger’s curse-word stencil creation. Makers such as Roger decided that a wide variety of making themes and subjects (including those one might term “adult”) was limited in the library. There were no rules on such “adult” making in the space. Yet any rule-breaking (real or perceived) was minimal. Everyone who felt a desire to create naughty, dangerous, or “adult” themed items either hid such desires

³¹ Manager Hannah described with pride the many times she printed out a sign up sheet for a program and posted the event on Facebook, and that the sign up sheet was full before she placed it on the circulation desk at the front of the library (fieldnotes 4/6, 411). She did not appear to consider what that meant for the patrons who were not in the library, or who did not engage with the library on Facebook regularly.

from me or censored those activities themselves. Concerns about “adult” themed making illuminated the tensions between the communal needs and the needs of individuals in the library generally and in the creative place specifically.

The Productive Library, as one might expect in a crowded urban environment, experienced the most tensions between Communal and Individual uses of the makerspace. This library prioritized broad and shallow access for everyone to sample the equipment over individuals’ repeated and/or deeply engaged projects using the space. They were not supporting the reality of iterative making practices, but capacity for brief learning activities. They were supporting the communal use of the tools and space at times by impinging on the individual uses. But they were attempting to find a balance between individual and communal needs in the face of scarcity. Sometimes that scarcity was self-imposed due to the library’s inexperience about appropriate types of making, such as when the library refused to purchase another vinyl printer.

Productive Library staff were upholding one tenet of the library’s vision statement, to “assure equitable access to the Library’s resources and services.” But they were framing another part of the vision statement—“Anticipate and meet changing needs”—in ways that did not always meet the needs of the existing makers in the space. The staff struggled to mediate between individual needs for assistance and their ability to serve all the people in the creative place. A lack of time and resources for building something like a community of practice—as well as the staff’s lack of interest in such—meant that users of the creative place had no structured way to support one another, and many barriers in place to limit such mutual aid.

The Target Audience

The Responsive Library was not, despite repeated claims of being a pro-business community, aimed at supporting the business needs of individuals. In fact, staff such as the team leader Jenna vacillated between praising users for being entrepreneurial in the space and saying that the space was not intended to support businesses (fieldnotes 5/4, 5/19). The tension between individual needs and the needs of the community was visible in this case through the attempts to

make access to equipment easier to reserve, while simultaneously limiting access for core users. It was visible in the library's spatial practices of keeping people separate, while also espousing a rhetoric of collaboration that had little basis in reality.

Patrons in this library had little connection to one another or sense of a shared venture into making. Still, nearly every patron was polite, respectful, and willing to wait their turn. When conflicts arose, the staff typically fell back onto technological or policy solutions, calmly looking at the reservation software lists or describing the library's policy limiting use of the machine. Occasionally, users became annoyed with each other, or spoke huffily to workers, but this was rare (Gladys, Jenna, Chuck). When I spoke to users, they seemed resigned about the limits of the space.

When these library workers dismissed the importance of user needs to create objects on the library equipment, they reframed the use of the spaces from "individual" back to "communal." The Productive community was lucky to have general access to the tools, they appeared to be saying, but no individual could count on being able to do what they needed to do. This was a different act of translation from the more commonly expressed one: that the spaces were intended for community benefits by ensuring individuals could accomplish any goals they sought to accomplish. The library workers were thus constantly negotiating the "legitimate" use of the space from communal to individual and back again.

Finding One's Tribe

This tension between the needs of the individual and the needs of the community, which is so visible in the other two cases, was barely an issue at all in the small Welcoming Library, aside from the need to jockey for limited spaces in programs. Instead, this library expressed **Communal – Individual** as a process, by helping individuals to find their communities, form relationships, share the task of making, and feel welcomed into a community experience. This library favored communal access and practices over individual ones, both by virtue of the actual use of the spaces and by the design of the staff. All the experiences in the space were shared. All

use of the space was during supervised programs. No one kept a machine to themselves, nor did they act as a barrier to someone else using it. But no one used the space at-will until the very end of my stay there, when Cassandra and Dahlia came in to make needled felted animals one evening. They came because they knew I would be there and wanted to make with me [fieldnotes 4/23]. They came seeking a communal interaction, a shared sense of making together.

Similarly, some users in the Welcoming felting workshops expressed their delight in making with others with similar interests (program attendees Vivian, Linda, Tammy). One of those women, Tammy, mentioned the differences in how she felt the 3D printing class and the felting class as hanging out with friends, rather than taking a college class. She enjoyed the social making:

...just making stuff with other people and seeing what they made. It gave me new ideas, you know? And I liked seeing what they did. Sometimes I wished I did it that way!

S: Do you think you'll use the space on your own? Maybe to do more woodworking or felting—or 3d printing?

I don't know. I could do a lot of that at home. I think the main thing is that it's more fun with other people. Like going to the movies is more fun than watching tv by yourself.

People in the other cases also expressed a desire to make with others, and to find “their tribe,” such as Responsive Library staff member Olivia and users Jack and Chloe, and Productive Library user Sean. These study participants expressed a desire for locating a community of like-minded creators with whom to share the process of making.

Negotiating Social Anxieties

Abby, the young mother who joined some of the fiber arts workshops in the Welcoming Library, described a different perspective about interacting with community members, involving social anxiety:

I seen Tuesdays there's some art things, and I was like, "Oh, I don't want to walk in there with a whole bunch of people." And I was like, "I might as well. I don't really have nothing better to do. And I might learn something. I might really enjoy it."

And I have learned, and I really enjoy it...I was wanting to go but just scared...my self-esteem is really low, so it just—I thought that people were gonna look at me. I don't know why, I always feel that way, I feel judged. But nobody's done that to me.

S: People are pretty nice?

Yeah, you're cool. [Laughs. Abby gestured at me when she said that, but I think she meant the library staff and other participants as well.]

Vivian, the Welcoming Library felting class participant who was a young professional and new to the area, was excited by the idea that people could teach or take classes based on their own interests. She'd seen the spinning wheel, and was hesitant to touch it because she didn't know if she could, or how to use it, or if anyone could teach her. She wanted to learn to spin. Yet, in her new small community she didn't want to come across as overbearing or a bossy city person or to "bust into" a spinning wheel class—by suggesting one. Instead she said she'd wait to see if such classes were offered. She was anxious about being perceived poorly and did not feel comfortable making her wishes known. She wanted to take classes to learn, but also to become more of a community member (fieldnotes 4/28—and see **Comfort - Unease**). These participants were describing some of the social negotiations that had to occur for them to use and feel comfortable in the space, and as they navigated their agency as **Subjects – Objects** in relation to the library.

Privacy

Privacy was a complicated issue in these spaces, and some staff, such as Productive Library team leader Jenna, worried about protecting privacy while also asking users to share their knowledge. For Jenna, privacy was entangled in her own individualist preference for figuring things out on her own, without interference, which she perceived as invasions of privacy. She did not see library staff as a way to assist community connections, preferring the labor of such connections to come from the space's users when and how they chose to pursue them.

Among the library staff, there was a push and pull between wanting to socially connect people, a desire to maintain privacy, and some social reserve in which library staff did not want to be responsible for or engaged in enzymatic library work connecting people together. The

Productive Library's mission statement says, "Connecting people with the world of ideas and information," but that did not extend to connecting people to one another. As with everything else in the space, the responsibility for social connections in the Productive Library space rested on the shoulders of each individual user (Jenna).

The tension between communal and individual played out in contradictory ways in the Productive Library: the policy decisions about who could reserve equipment and how often were aimed at communal access, but the lack of collaborative support or sharing of knowledge between people was focused on individuals learning things on their own, for their own reasons, and without much help. Thus the culture of the space was DIY (Do It Yourself), rather than a DIT (Do It Together), in terms of personal responsibility. It shifted to a DIT space or even DWWW (Do What We Want) in terms of institutional values. The other two libraries appeared much more comfortable with entering the social spaces of the users and inquiring about their making, whereas Productive Library staff kept a distance between staff/users, and users/users. Staff named that distance "privacy." At times, that so-called privacy was more about social control in the shared space.

The Capability of Coexisting and Connecting

Illich (1973) says that "The use of [convivial] tools by one person does not restrain another from using them equally" (p. 35). In fact, Illich said, conviviality is not attained *despite* other people, but *through* interdependence (p. 24). In these library creative places, that interdependence was visible as people amended their use of the spaces around and through other people. Tools had to be shared, time had to be allotted, and information had to be disseminated, and these activities occurred through negotiations between the community and each individual. The libraries and people who used them navigated the various social tensions inherent in sharing while building valuable relationships and social trust. The navigation was visible every time a person used the space, and the capability of coexisting was a necessity.

However, the relationship-building aspect of this capability, connecting, was the most

subtly enacted or desired finding in all three cases. Yet this capability is crucial to the conviviality of the makerspaces, even though quite a few of the participants in this study³² expressed little verbal interest in building relationships in the library spaces or socially interacting. Unlike the sharing and coexisting aspects of this capability, the interdependence of mutual support and community-building is barely visible in some interviews or spoken expressions of the participants in this study. While some people came into the spaces because of a desire for interdependence, and others thrived on social making, many participants expressed their need for this capability tangentially or non-verbally (for example, by peering closely at others' projects or practices). A few denied that social interactions or shared making were valuable at all to them—rendering this capability of questionable importance for some people, and necessary for others.

Yet even if social *interactions* were not required by most people, social *connections* were lauded. Nearly every participant in the study seemed interested and curious about what others made, the other people's skills and making processes, and they wished to know more. They wanted to see books of previous projects by other users, join show-and-tell activities, and casually converse with people in the space. They wanted to connect with others as makers. Yet if I asked if they wanted to use the spaces specifically to connect with others, they often said "no." This was particularly true in Productive Library, where almost half of the users I asked said they had little or no interest in making new friends or socially engaging during or through their making experience. At the same time, those that did describe a desire to share knowledge and skills or engage with others, like long-term maker Sean, were passionate about the need for social, shared making activities. These participants highlighted this aspect of making as foundational for their reason to come to the library, saying they could make elsewhere, but that a shared space allowed for shared making that was pleasurable and desirable. In fact, the activity of co-making allowed

³² Users who explicitly said they had no interest in, or saw no possibility of, making friends, hanging out, or building community in the library creative places: 2 of the 14 users in Welcoming Library, 10 of 21 in Productive Library, 2 of 13 in Responsive Library. I did not ask all users this question, and these numbers represent only those users who explicitly spoke about relationships in the space.

for easier, less-anxious social connection.

Even for those uninterested in shared making experiences, coexistence and sharing remained critical to their ability to work in the creative places. To ensure equitable and peaceful sharing, potential conflicts were mediated in the spaces through technological solutions (such as computerized reservation systems), and interpersonal interactions, (such as when users politely asked one another if they were finished). For the most part, conflicts were avoided, and the people were able to share the tools comfortably. Breakdowns in this sharing rarely occurred in face-to-face interactions. Instead, they occurred in the same way they were mediated, as with stressful interactions with reservation systems, or when jockeying for a piece of equipment, when those reservations failed. The staff then had to ensure the Capability of Coexisting and Connecting by limiting some uses of tools so that others could benefit—reflecting each library’s mandate for equitable access. Nevertheless, issues of inclusion remain unsettled in these spaces, reflecting the racial and gendered exclusion in these spaces more broadly.

Comfort – Unease

When users described feeling comfortable or uneasy in the space, whether it was physical, social, or mental, such codes were sorted into the theme that describes expressions the tension between comfort and unease. This category can also involve emotional labor, such as the work done to ask questions or make people feel welcome, and it refers to the dispositional sense that many participants described in terms of their personality predisposing them to feel particular ways in the creative places. This tension also includes the “fear of the blank page” *in vivo* code that expresses discomfort when confronted with a perception of too many possibilities and not enough skill.

Users in the Welcoming Library expressed the most comfort with their space. Through Hannah’s work in decorating and arranging the spaces, hanging out and relaxing as if one were feeling at home was encouraged. This sort of hanging-out mentality was also made possible by the welcoming and proactively hospitable attitudes of the staff. It was visible when library board

president, college student, and library user Megan described what she thought the library was for:

I like this library in particular, because this library is for coming in, and talking to the ladies in the front desk about what is going on in town. It's about coming in and finding out what just happened on [Highway] 96, just having a cup of coffee.

However this comfort was more visible in other library spaces than the creative place at its periphery. There, people were not always comfortable in entering the space (when it was dark and looked like a store room or staff space) or in speaking up to ask for what they wanted (Vivian, Rueben, Tammy). In many ways, the physical comfort in these spaces was less important than a sense of social comfort and welcoming, which were possible through both the library and other users' interactions in the space, and through a person's own personality and background. For example, some non-users did not feel comfortable in the spaces because they did not understand them or have sociocultural access: "I wouldn't know what to make there," said Luisa, a non-user of the Productive Library who felt uncomfortable there.

Physical Comfort Impacts Emotional Comfort

Physical comfort in all three cases was often lacking. The chairs were hard, the temperature was cold, the lighting was too dim or too bright. The Welcoming Library's creative place offered backless stools, poor lighting, and a chilly old school classroom, contrasted with the warm carpeted spaces in the library's central rooms. Bodies using the spaces were often ignored, however, as those discomforts fell away in the process of making. This was my own experience in the spaces, and some users noticed similar issues (fieldnotes 4/21, 9/2). Physical comfort was seen as a marker for inclusivity for some library staff. For example, Responsive Library staff member Olivia, who is active in feminist fat-acceptance groups, saw the metal stools in that library as a barrier to some users, and wished there were a variety of seating options.

The spaces were not usually loud, contrary to the expectations of the library staff and some of the users. However, even soft voices and the beeping and buzzing of machines becomes noisy when bouncing around hard surfaces. Especially in the Responsive Library, the clatter of the machinery echoed against the hard surfaces until it was hard to hear people talking. This was

a social space, and people talked to each other a great deal, but sometimes their voices would rise to uncomfortable levels to be heard. In Productive Library, a large room with high ceilings and carpets meant the space stayed quiet. In fact, noise seemed to vanish in this space, which sometimes made people having conversations need to lean their heads together to hear (fieldnotes 5/12). Lighting was good in these spaces, especially in the Productive Library, with its walls of windows. In Responsive and Welcoming Libraries, the lights were bright overhead, yet cast deep shadows when one bent over a sewing or electronics project, making it hard to see to do fine detail activities like solder or thread a serger.

The design decisions that might have been imperceptible or non-problematic in other areas of a library became troubling when one spent significant time in the space. As a researcher in the Responsive Library space for large blocks of time over months, I shivered in the cool air, on hard stools, often for hours, but no longer than other makers intent on their lengthy creation processes. This space, with its bright lighting, and ambient clatter, was not ideal for these long-term sitters, whereas long-term sitters in other areas of the library were offered soft comfortable chairs and sound-dampening carpets.³³ Making is often a long-term activity, taking hours to unfold. Each library's design choices were intended to ensure the space was cleanable in the face of messy making. The tradeoff was comfort. However, the people who designed the space felt they were welcoming and comfortable. Trustee Erika loved the lighting in the Responsive Library space, for example.

Just as concerns about noise were unwarranted, worries about mess were unsupported by practice. Only Welcoming Library had any sort of mess, and that was due to the clutter of some storage spaces visible behind the makerspace area, and some transitions in the space as the staff shifted materials out of open wire bins and into sleek closed cabinets. Library manager Hannah was proud of those new cabinets. This was one of the times in this study that it seemed that the

³³ Some carpet and comfortable chairs were offered this in the creative place as well, though the small seating area was rarely used by people making. Instead it was sometimes used by people waiting for others to make, such as parents of children under age 13.

library staff who were designing the spaces were blind to user perspectives. Hannah's new cabinets were tidy and attractive, but also institutional looking, and locking. They lacked any indication that users could open them and use the tools inside. Hannah perceived increased tidiness and reduced visual chaos with the cabinets, instead of the previous open wire bins of tools and supplies. Users saw locked cupboards where they were unwelcome to rummage around as they would have previously (Yolanda, Colleen, Vivian). Meanwhile Hannah bemoaned the fact that:

I find that people don't want to go in the room because they think that they're not allowed. There are no 'NO' signs in this entire library, but to be able to come in on their own, they just feel like they're not supposed to and I'm working every single day to get past that barrier that we never even put up.

Such decisions were a tradeoff: reducing the cluttered appearance of the Welcoming Library space made the room appear less like a backstage, staff-only area, but it also rendered many activities in the space, that had been self-evident, invisible. Users had to ask what was possible, requiring a disposition that was comfortable in asking.

Dispositions

Library staff sometimes noticed the lack of emotional or mental comfort some patrons had in the spaces and wanted to change that. They struggled with ways to ease that discomfort. Unfortunately, users often believed they were not welcome in spaces that were meant for them. Emotionally, a different sort of comfort and unease arose for some users—deriving from their own dispositions.

Many of the study participants described their initial dispositions shifted in response to the space. There were many new things for most users to experience, from tools and types of making, to different ways of being in a library or interacting with library staff and other users. The shifting dispositions often emerged from a new relationship with making and objects. After using power tools to build something, Robin, a user and library system employee in the Welcoming Library, said she “felt like a powerful woman... Afterwards like I can do this and I can

do anything.” She said about the shared experiences in programs:

When people interact with each other and maybe a skill or something information[al] but it produces this equality maybe. It produces confidence, empowerment for lack of a better word, joy. It’s kind of like an individual fulfilling his or her potential.

Study participants such as Robin felt a sense of exhilaration when they acquired intellectual access to tools they had never known how to use.

Many users reported changes in their dispositions after learning new skills or finishing projects (e.g., Welcoming users Linda, Dale, Yolanda; Responsive users such as Chloe, Sylvie, Jack). Hannah enthused, “What I’ve seen in programs that we have here in the Makerspace is just people going from, ‘I can’t do this’ into ‘Look what I created,’ getting over that barrier that they have within themselves.” When people did express comfort, it was often dispositional. It emanated from expressions of confidence in one’s own abilities or in previous experience. At times, participants related feeling comfortable due to the work done by library staff in initiating them into the culture and practices of the spaces. But this comfort was gendered and racially-influenced. These dispositional shifts drew some women into the spaces, as when charismatic and enthusiastic manager Hannah, in Welcoming Library, found a community of women eager to explore fiber arts, woodworking, and photo archivism. She did this through active outreach to nearly every person she met, in and outside of the library. Yet in Productive Library, no one spoke of their own disposition shifting in response to their own use of the space. Instead, participants such as homeschooling mother Allison and father Kent described the potential for their children to shift their dispositions, or other members of the community who needed some dispositional uplift (e.g. Sabian, Mia, Amanda).

Some people who were new to making reported a shift in disposition. They felt more confident and used terms like “empowered” (for example, Robin in the Welcoming Library). New woodworkers Colleen and Yolanda, new designers like Jack, and new sewists like Sabian felt that they were acquiring the skills they desired and that these skills shifted their relationship with the world. Still, the dispositions required to surmount the barriers to using these spaces could be

significant, especially in the Welcoming and Productive Libraries. People had to be self-starting, persistent, willing to ask questions, and able to learn on their own. All of this requires a level of confidence that could perhaps be instilled by the use of the space (as those new makers describe occurring). But many people needed a hand to hold in getting over the invisible speedbump that these spaces threw in their path. Sometimes this hand was not there—as in the Welcoming Library’s lack of staff time to support users and dark abandoned-looking space, and Productive Library’s decision to avoid introductory programs or orienting signs, and to minimize staff instruction. Nevertheless, shy Welcoming Library user Abby, discovered that her unease about the social act of making melted away when the making was friendly, and supportive. She grew more comfortable with her own presence in the space and the people around her, as well as with her own making practices. She never seemed to grow comfortable in asking for help, but at least was comfortable enough to, at the very end of my stay at Welcoming Library, volunteer a “hello” when she saw me (fieldnotes 4/28). Others, such as Vivian, never felt comfortable enough, while I was at this field site, to suggest potential programs that she was interested in. She did not have enough of a history in the village to feel she had the right to make any demands (fieldnotes 4/28).

Socioeconomic Factors

How users saw the spaces and what they were allowed to do in them varied along their dispositions—the way they saw the world and their place in it. At times, socioeconomic variables also appeared to shape people’s native dispositions and to drive how comfort was perceived in the spaces. For example, Victor, a young white man in the Responsive Library, expressed the sort of social trust and trust in one’s own abilities required to enter the space. But the several non-users in this and the other cases (such as Aaliyah, Luisa, Jordan, Xavier, Garrett) noted a sense of alienation, and a need for a self-directed disposition to motivate one to enter the space at all. But Victor spoke highly of the architectural design choices and the location of the creative place as a way to encourage users to step inside. Similarly, he felt the staff were on his team, placed there to ensure he got what he needed. Victor described a sense of connection to the space. He felt at

home there. He had a technical background, and was doing projects that were aligned with the institutional view of what should happen in the space—designing and creating items that he learned to create at the library, on his own. His disposition led him to feel comfortable.

Victor's comfort may have been due to more than his maker disposition, or his alignment with the creators of the space and their understanding of what a makerspace should be. The clear discomfort some people of color and women expressed may have been due to a misalignment. The arrangement of the space and the “golden rule” desire of team leader Jenna to leave people alone as she would like to be left alone (which I discuss in the section **Communal – Individual**) privileges an individualist, disconnected, down-to-business atmosphere that resonates for some users, but alienates others. Perhaps the answer to Rose's question about the “prerequisite” to enter and use the space, is that a particular disposition, and a socioeconomic ‘whiteness’ and ‘maleness’ is required to feel comfortable within it.

Some participants expected that libraries would do better than traditional makerspaces in ensuring equitable access. For example, long-time maker Roger, a user and Advisory Council member in the Responsive Library, thought that women and people of color might feel more comfortable in this library's space than a traditional makerspace. Unfortunately, the thing Roger expected libraries would excel at—welcoming diverse people with little sociocultural access, exposing them to the space in a way that was relevant to them, and ensuring they feel emotionally comfortable in the space—was not easy. For example, the connections between advanced digital tools and women in this space did not always go as planned and assumed. Even though the people in the Responsive Library space who were teaching people how to use the tools were often female—Olivia and Shelby—women and girls used the “high tech” STEM-type tools far less than men and boys.

I never saw a female use the laser etcher in the Responsive Library space, other than myself. Nor did women, other than those who worked in the space (and me), use the CNC mill. While boys and men used the 3D printers at the Responsive Library space every day, from the moment the space opened until I left my fieldwork there, I never saw a female attempt a print

without her father taking on the bulk of the task. Similarly, in the other two libraries, clear divisions appeared along gender lines. Only one small girl used a 3D printer in Productive Library. While no one used the 3D printer in the Welcoming Library, the gender differences in the people attending the 3D printing and fiber arts classes were striking: there were no men, and one boy, in the fiber arts class. There were two women and 10 men in the 3D printing class. In general, people of diverse genders had different interests in using tools or attending classes. The “if you build it they will come” assumption of providing tools did not appear to work as anticipated with women.

Tolerance and Change

One of the types of comfort and unease I saw in this space revolved around staff attitudes toward the creative places. This was most obvious in the Responsive Library, where technology director Justin, staff member Olivia, and library director Richard felt comfortable with making and the sometimes-chaotic noise, mess, play, occasional roughhousing, and failure that were entailed in the making process. Others were less comfortable, such as marketing director Leslie, who tried to tone down the noise, clutter, and limit possible outcomes of user behaviors to ensure peaceful coexistence in the space. Other staff members were less comfortable still, not even feeling welcomed in the space, though they were long-time library workers (such as reference and children’s staff Madison, Sandy, and Rebecca). Some library staff agonized over the needs of the community when faced with the expenditures and staffing in the makerspace. Youth services librarian Madison worried about the children and families she wanted to serve, who often did not have enough to eat or warm clothing, and considered the makerspace a frivolous use of funds, even though it was largely funded by grants and donations that would not have fed or clothed anyone. She was uncomfortable with what she saw as a fundamental change in library priorities.

Justin and Richard were well aware of some of the staff’s attitudes. When noise or laser cutter smoke rose into the main library, they swiftly addressed the issue to ensure the public and the other library workers felt comfortable, or at least less uneasy about the activities going on in

the basement. Justin and Richard worried about dismayed reactions from the community and from the staff. Richard was careful to try and include all staff members: “I don’t want my staff to feel like I was pulling a rug from under them, completely upending what the library was.” Still, some staff DID feel the rug was pulled out from under them. Small battles erupted over who “owned” some glue guns—the children’s staff or the makerspace staff. Some staff expressed resentment at the shifting priorities from book-centered services to more program-oriented and making-oriented services, even as they said that such services would help the library’s long-term viability as a helpful or relevant organization in the community.

An interesting finding regarding tolerance involved the style of the makerspace workshops and events. There were more and less structured programs available in the Welcoming and Responsive libraries. Most participants in this study tolerated these differences. They identified both types of class or engagement as valuable—the looser hands-on classes and the more structured classes, for different people and different reasons. Some of the women in the Welcoming Library identified community, friends, a new sense of ease and comfort with creation as the primary reasons they liked the workshops. Some also spoke about the learning they were able to enjoy, as 3D printing class participant Jerry did. He liked the intensive college-course-like nature of the 3D printing course. Both types of programs seemed necessary to meet the needs of a diverse community. I conjecture that some participants likely would have been disappointed by the laid-back hands-on sampling of the felting workshops, particularly if they were already conversant with the basic skills of felting, but have no clear evidence of this, since no one complained. Others appeared to desire more hands-on engagement with the 3D printer in that class, and were the rare participants to express dismay about how things were taught (Reuben, Tammy).

The Capability of Adapting

Illich describes a culture of frustration with the offerings of institutions. In this study this frustration was often seen in the small pinch-points when people tried to do things outside the

plans or values of the library, or the tools offered there. When users could not adapt their tools or the space, could not move chairs, or when they just felt uncomfortable in the space for personal or cultural reasons, they expressed frustration or left the space. This comfort involved the ability to amend the environment to meet one's needs and a personal disposition that felt safe and at ease in the space. The tension between **Comfort - Unease** was most visible in the dispositional self-assessment people did, often subconsciously. For example, when some people left the space without engaging with it, they noted that they did not feel as if they were comfortable there or as if the space fit their disposition.

I discussed some of the practices limiting some types of control over the environment in the section discussing the Capability of Acting. That capability addressed the positionality of the participants in these creative places, in general terms: who is acting, who is acted-upon? A more technical and pragmatic set of issues arises in the Capability of Adapting: Can users move the table or change the media in machines? Can they repurpose equipment? Can the user feel comfortable in the space by swapping chairs or through easy access to electrical power? These questions hinge upon the user being able to adapt the environment to their personal needs, while also keeping the shared nature of the space in mind. In Welcoming and Responsive Libraries, users could and did move equipment, change media, and adapt the environment to their needs. In Productive Library, this was rarely done; I only saw one person move a chair from one station to another in a month of observation.

The Capability of Adapting thus speaks to two things. First, it highlights the potential for dispositional shifts and the necessary ability to fit comfortably within each library's culture. Users must be able make sense of themselves and the space through the framing the library offers. Second, the Capability of Adapting is a pragmatic issue about the space and tools, how flexible they are, and how much users are trusted to change the environment in which they are working.

Conclusion

The day-to-day power exchanges occurring in a public library creative place revolve

around the seven capabilities explored above, through or despite the seven tensions that comprise the themes of these findings. Underneath all of the obvious helpfulness, tools, and information provided by the libraries and the communities, these tensions block or facilitate hidden pathways of power and connect, complicate, circumvent, or enable individual and institutional ambitions. Users feel a sense of agency (or do not), institutions invoke forms of social control (or do not), and goals are accomplished (or are not—and may not even be conceptualized as goals). These power-paths are collapsed and simplified and managed by institutional discourses and practices. Some of the library creative place users' actual paths were erased by an institutionally-conceived trajectory—one that arcs confidently from ignorance and/or lack of resources toward economic innovation and skill-building. All of this occurs quietly, with smiles on most faces. Only when one sits in a public library makerspace space day after day, speaks with users and librarians in depth, tries to make things, and is otherwise nosy and curious, can one see when, where, and how the power lines fracture somewhere between the users and the library.

Chapter Seven: Discussion and Conclusion

The purpose of this study is to explore the practices of power in three public library creative places by examining the described and observed experiences of a variety of stakeholders. The study reconnoiters decisions made by individuals and institutional actors, both on their own behalf and on the behalf of the library or other allied organizations. It does this to establish some of the ways public library makerspaces have benefited or hindered people and communities in their goals, and their perceptions and processes of power. It seeks to understand who feels they can do what because of the spaces, and why they feel that way. To explore these practices and understandings, I asked what about people's lived experiences in public library creative places, focusing upon both the institutional and individual discourses and practices involving power in these spaces. I also asked how convivial tool theory could interact with those discourses and practices.

While I answered these research questions implicitly in the findings chapters, in the following sections, I briefly reiterate the methods used to ask them, and more explicitly state conclusions to each question. Several conclusions elaborate and contextualize the findings. I then compare each conclusion to prior research, highlighting the similarities and differences between past researchers' discoveries and my own. Finally, I discuss the findings' limitations and implications for the field of Library and Information Science.

Overview of Methodology

To accomplish this study's exploration, I used ethnographic methods that allow the users to describe their feelings and thoughts in using the spaces. In addition, comparative case study design allowed me to explore the culture of three quite disparate spaces. Each of these cases acted holographically to inform my understanding of public library makerspaces more broadly. Through participant observation as a maker, I have established my own sense of the spaces, tools, people, and cultures, and I was inspired by the concept of "critical making" in which one thinks through problems through the work of one's hands, although ultimately I did not use specific

“critical making” activities as a research method.

Using constructivist grounded theory, married with sensitizing concepts related to power and convivial tool theory, I analyzed the narratives and practices various stakeholders employed in discussing the spaces and their use, the policies, budgeting, marketing materials, and design considerations of the spaces, and the fieldnotes of my observations of the practices in the spaces. The ways in which convivial power relations were expressed in practice (or were not) emerged inductively from the mountain of data and analysis. In addition, deductive pre-generated codes based on convivial tool theory established how, or whether, convivial tool theory overlaps with the practices in the spaces. All of the key points Illich (1973) raised in *Tools for Conviviality* were clearly visible in the data, though some were there vestigially.

Johri and Pal’s (2012) work on information and communication technology for development also inspired this analysis. They marry the work of Illich (1973) on conviviality and the work of Amartya Sen (2009) on the capability approach to social justice, to describe a Convivial and Capable Design (CCD) ethos. The capabilities Johri and Pal identified as crucial to a CCD design were:

1. Access to artifacts (Ease of Accessibility)
2. Ability for self-expression (Expressive Creativity)
 - (a) Ability to use personal energy creatively
 - (b) Ability to personalize the environment
3. Ability to interact and form relationships with other people (Relational Interactivity)
4. Opportunity to enrich the environment (Ecological Reciprocity) (p. 67)

I used the CCD as sensitizing concepts when I developed the questions for the semi-structured interviews. As I focused on the data, the sensitizing concepts fell away and the particular power enactments in these spaces emerged. As I sorted and categorized the coded data, I was astounded to find that Johri and Pal’s CCD model mapped almost exactly onto many of the findings in this study, with a few exceptions and a few expansions.

Findings And the Research Questions

The findings described how power was enacted by users of three public library creative places and the library staff, administration, trustees, as well as city officials and other community stakeholders.

Research Question 1

RQ1: What are the lived experiences of the stakeholders in public library creative places, specifically involving power?

RQ1a: What are the institutional discourses and practices involving power in these creative places?

RQ1b: What are the individual discourses and practices involving power in these creative places?

The lived experiences of the stakeholders, specifically involving power, are a complex negotiation of what the spaces are intended to accomplish or accommodate. This negotiation occurs at every stage of makerspace involvement, through the institutional and user discourses and practices involving:

- accessing the space or activities possible within it and benefiting from its use—or running into barriers to that access;
- understanding what the spaces are for—or *not* understanding it, or forming an understanding shaped by the library’s ways of framing the spaces, so that the spaces are not always useful tools for the user’s needs;
- circumventing doubt while building and benefitting from trust—or lacking trust in the people, tools, or institutional actors and aims;
- navigating the various social tensions inherent in sharing and coexisting, while either facilitating the construction of valuable relationships or avoiding such social interactions;
- acting in charge of in one’s own making, or being acted upon by the institution’s goals, which often involves getting help while avoiding unnecessary control, and allows for a range of contingencies or outcomes;
- deciding what means and ends are supported by makerspace activities—whether those possibilities emerge from learning and uplift, and/or if they can accommodate expression and fun for their own sake, or whatever the user values or needs;
- and making oneself comfortable in the space, as if it is something has one the right to inhabit, through either dispositional factors or through modifications in the environment until it meets one’s needs—or feeling uneasy in the space, as if one does not fit there.

These are the seven tensions of the findings. The tensions are most visible in decision-making processes. To contextualize these findings in terms of the so-called “empowerment” of these

spaces, which inspired this study, I found that the empowerment in the spaces is often limited to those who already have it, for purposes that emerge through discourses of individualism, picking oneself up by one's own bootstraps, STEM education, and economic purposes.

My hypothesis when I began this study was that institutional discourses and practices of power would shape the capabilities and power of the users of library makerspaces, potentially in convivial ways, but that users would also shape the library and other user's experiences in turn. This hypothesis was correct, in part. The institution shaped the capabilities and power of the users. However, far less power was enacted by the users on either other users or the libraries—though that varied by library. For example, Responsive and Welcoming Library's tools and programs were shaped in part by user desires. User connections, while rare in two of the libraries, did appear to expand the capabilities of other users, though these connections were rarely full interactions.

I also wondered about empowerment at the start of this project. Slalova (2014) looks at the capability approach to designing technological education in South Africa. They define empowerment as “the intersection of agency and existing opportunity structures; where agency consists of the capacity of individuals to make meaningful choices” (p. 1). As in Slalova's findings, in this study the capacity for individuals to make meaningful choices was limited by technology, a lack of participatory design, and by the controlling practices of those in charge. Choices were severely limited by the smallest and largest libraries in this study. Despite nearly all of the library workers describing their desire for convivial power relations, and their claim that the creative places are convivial tools, in practice, many library actors choose to facilitate power for some people and activities more than others. In this study, the discourses and practices of power in these spaces privileged the users who were doing specific activities and had goals that aligned with institutional values of learning, skill building, and economic uplift. Activities aimed at user empowerment often (though not always) focused upon these institutional values. Practices existing on the margins or outside these values were less visible and the people engaging in the decentered practices had fewer choices or expressed less power in terms of their capacity to

make meaningful choices.

When discussing empowerment and user governance in public libraries, Engström and Olsson Dahlquist (2019) break down intransitive and transitive forms of empowerment. In intransitive power enactments, people are able to participate in some activity in a way that expresses their own power. In the case of transitive power enactments, the person is seeking to empower others and often they “are governed to participate in accomplishing a goal over which they have no influence” (p. 319). In the case of these public library makerspaces, *empowerment* was a concept used in both senses. Robin described a process of self-empowerment, but often the library staff and administrators described a process of empowering the community. Participants shifted from one sense of this empowerment to another when asked about the value or benefit of the library creative places. For the most part, however, the “empowerment” was transitive.

These participants code-switched. They expressed joy and contentment with their own playful creative activities and gift-giving, which often fell to the periphery or outside the institutional narratives of the spaces. Then they switched into high-minded discussion of the empowerment of others in response to questions about the value of the space. Participants described empowering those less fortunate than they were: single parents, children, people who were poor or without job skills. They saw little institutional value in their own playful activities—even though that play was what they wanted to do. Unfortunately, in 2016 underserved populations remained underserved. While this may have subsequently changed, and despite some individuals having the disposition and ability to navigate the spaces, marginalized groups such as people without homes, people who were poor or less-educated, children or teen parents, were often positioned as the objects being acted upon by the provision of the spaces—both by library actors and users of the space. Unfortunately, so little outreach was performed in all three cases, these marginalized groups were not acted upon, much less offered a comprehensible opportunity to benefit from the spaces through their own agency. This was in part due to the very constrained resources and time of the public library workers.

Research Question 2

RQ2: How can convivial tool theory intersect with these discourses and practices?

Convivial tool theory clearly intersects through the individual and institutional decisions, discourses, power negotiations, and practices in these spaces. In the findings, the convivial imaginaire is perceptible—one in which libraries are tools used by the users for the purposes they deem important—though this imaginaire is variably supported in practice. Every concern Illich (1973) prophesied in non-convivial tools were tangible:

- Radical monopoly was visible in the **Access – Barriers** tension when various forms of certification were required to use particular tools, even when users had the skills already in place, or when library professionals selected which tools were appropriate for particular users to access;
- Overprogramming appeared when the library tried to steer the purposes to which the makerspaces were put, in the **Uplift – Fun** tension, and when learning was prioritized over other reasons to use the spaces, even by users who invoked goals and reasons for using the space that did not center on learning;
- Polarization was visible in the threads of **Trust – Doubt**, when users were offered opportunities to make decisions for the makerspace that were “toddler’s choices.” It also appeared logical extension of when only library actors were able to make determinations about what the spaces would include, and when users distrusted the library staff or the staff distrusted the users;
- Obsolescence most strongly appeared in the tensions **Exposure – Framing**, where some activities and types of making were marginalized by the library, or hidden behind public-facing narratives of reskilling for STEM-oriented “21st century” work;
- Frustration developed most in the tension **Comfort – Unease** when users felt their own uses of the spaces and tools were less important than those prioritized by the library or our overall culture, and when they felt they were disrupting approved library practices by asking questions or “bothering” library staff.

The active mastery, and interdependence that are key components of a convivial tool were also evident:

- Active mastery was built through (or despite) the tensions labeled **Subject – Object**, when users felt that they were able to take control of the makerspace as a tool they wanted to use, without the libraries acting upon them in ways detrimental to their own agency though either too much “help,” or by being positioned as a passive receptor of the library’s choices, as well as through the ability to enrich to the environment through one’s own contributions;
- Interdependence was clearly visible in the tension **Communal – Individual**, as when both library actors and users had to negotiate sharing tools with others, to determine the collective or individual benefits these spaces could provide, or to develop their making and work through social interactions with others.

Conviviality is the story the developers and users of these spaces tend to proclaim. While this imagineire is not entirely supported by the practices and discourses occurring in the spaces, the people using the spaces have outlined seven ways in which they COULD be convivial. These are the capabilities of the Convivial Capability Checklist (C3). Moreover, these users have determined that they want the spaces to be convivial, though in different ways for each individual. Some want more power in decision-making, for example, while others simply want better support for their own goals.

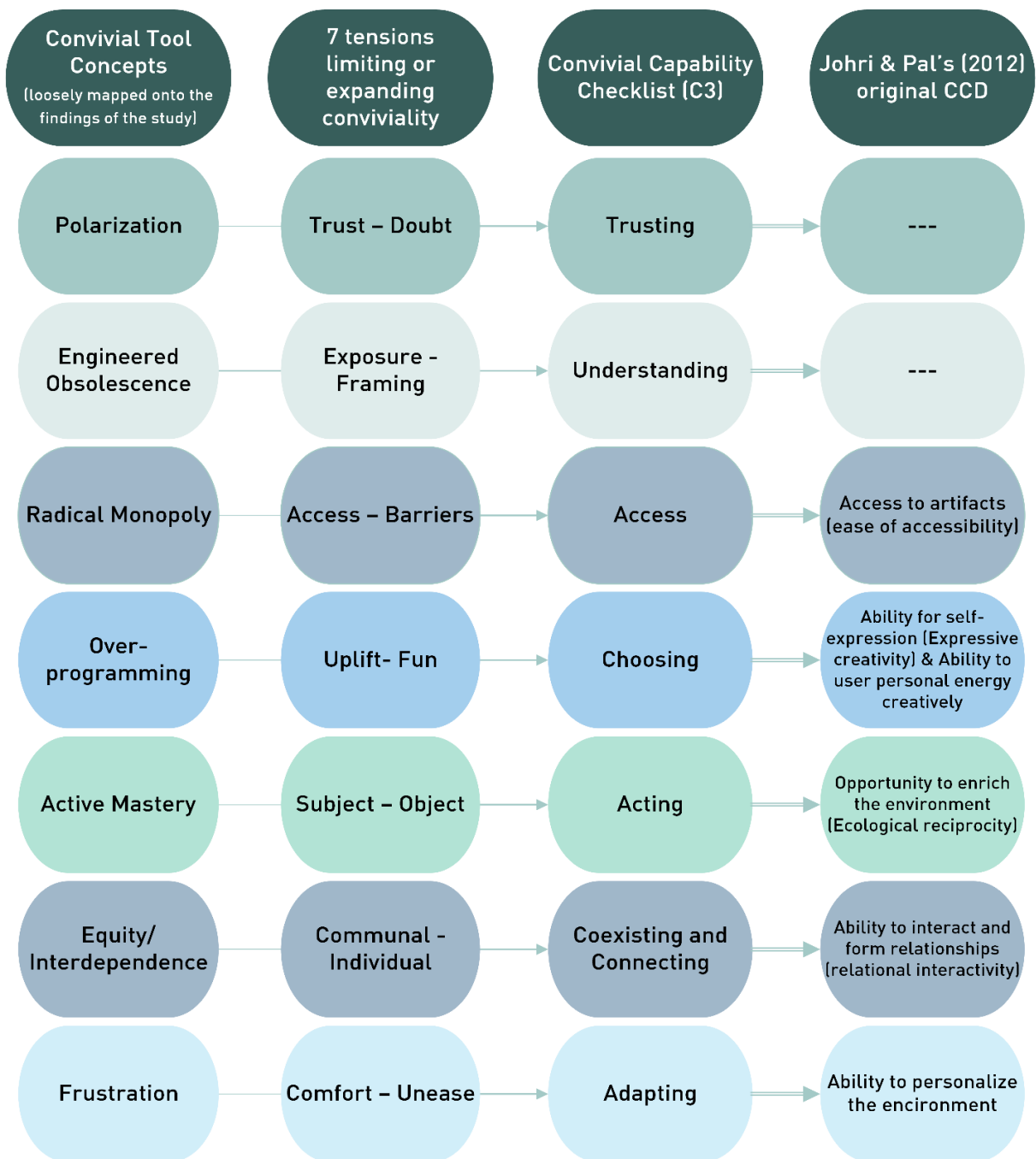
The fact that the public library creative places were convivial tools for only a small portion of their intended audience demonstrates a need for a clearer understanding of what it does mean to develop these makerspaces as convivial tool. Thus the seven tensions of the findings inspired an updated version and empirically grounded elaboration of Johri and Pahl's (2012) CCD model, which I call the Convivial Capability Checklist (C3).

These capabilities are grounded in the tensions described in the previous chapters. This model explicitly demonstrates how convivial tool theory can intersect with the practices of power in public library creative places, answering Research Question 2. Many of these capabilities and the tensions described in the findings have already been explored in the convivial tool or makerspace literatures in implicit or explicit ways. In particular, Johri and Pal (2012) describe a model of conviviality (CCD) through the various capabilities that must be supported to attain social justice and ethical information technology development.

This study found that their CCD model aligned well with the power enactments in three public library creative places, with some amendments and reconfiguration to the CCD model into the C3 model. For example, Johri and Pal (2012) link together the "ability for self-expression (expressive creativity)," the "ability to use personal energy creatively," and the "ability to personalize the environment" (p. 67). With this combination, the authors contended, "people should have the freedom to express themselves such that they are able to use their effort in a creative manner and also be able to modify the environment or the tool in a manner that is personally useful and satisfying" (p. 67). I renamed and combined what they call "Ability for self-

expression” and “Ability to use personal energy creatively” into one capability—the Capability of Choosing (One’s Means and Ends), because sometimes in the data, that purpose may be creative or expressive, but sometimes it is not.

Figure 18 Convivial tool concepts and findings



Johri and Pal (2012) also list “relational interactivity” as a key capability in their Convivial and Capable Development (CCD) model, and link it to ecological reciprocity (which in my C3 model is a subcategory of The Capability of Acting). In their studies, Johri and Pal identified people learning with others, sharing with others, and forming relationships with others. The need for such sharing and social interaction has been found in other studies on social making, such as the Men’s Shed’s movement (Wilson & Cordier, 2013), children’s making (Ames & Rosner, 2014), and the formation of hacker/maker identities and communities of care (Toombs, 2016). In addition, two of the main findings for this study are so critical to the power enactments in these spaces that they are foundational capabilities—and are either not visible in Johri & Pal’s (2012) original CCD model, or are packed within other concepts. In this study, the Capability of Trusting was fundamental. But this was not elucidated by Johri and Pal. Nor did Johri and Pal’s model describe sociocultural access as vital as the findings of this study suggest.

Discussion

This research explored whether and how three public library creative places are convivial tools, tools that embody a power relationship within their affordances, wherein the designers or facilitators of the tool cede power to the tools’ users, so the users may decide how, why, when and where they use the tool. As each library insisted (and many participants believed), these spaces are described as convivial tools. No participants used the term “convivial tool.” Yet many participants alluded to the idea that the spaces embody convivial power relationships within their affordances, wherein the library actors cede power to the space’s users, so that users may decide how, why, when and where they use the tool. These are two of the main takeaways of the study—that the spaces themselves are not particularly convivial, but that users and library workers alike WANT them to be convivial, and are defining them as such. The other key conclusions I will explore here include conviviality masks, user dispositions, reproduction of inequities, the need for social trust, institutional values and hidden curricula, social interactions, serious and recreational leisure, and how the tensions can assist us in creating more convivial tools. These

important findings span the tensions or categories of the grounded theory analysis, at times emerging from two or more of those categories.

Public Library Creative Places Reproduce Extant Inequities

Political economists Kahn and Kellner (2008) look at technology, learning, and the work of Illich and Paolo Friere to establish how these technologies might be liberatory or oppressive:

In discussing new technologies and multiple literacies, then, we must constantly raise the following questions: Whose interests are emergent technologies and pedagogies serving? Are they helping all social groups and individuals? Who is being excluded and why? We also need to seriously question the extent to which multiplying technologies and literacies serve simply to reproduce existing inequalities in the present, as we strategize the ways in which they might also produce conditions for a more vibrant democratic society in the future. (p. 441)

This study addressed many of these questions. The resulting picture of public library creative places is contradictory and laden with tensions, and moreover the places appear to reproduce existing inequities at least as much as they eradicate them. The findings show that these spaces are not truly convivial tools for many community members, though the depth of non-conviviality varied by library and staff member or user. The creative places are fully intended to be liberatory and serve the entire community—particularly those that were less well-off—but only within the framings each library authorized. Some of technologies offered by the library are novel or emerging technologies that some people are thrilled to discover and use. Others are intimidated or alienated by them. Others have no interest in them whatsoever. The boundary between these groups of people is often drawn along gender, racial, or educational lines, just as several other studies have found (e.g. Cirell, 2020; Greene, 2021; Higginbotham, 2020; Mann, 2020; Melo, 2018; Sanchez, 2020). The interests of those who already have skills, knowledge or understanding of the spaces are served above those who do not—and often those have and have-not groups map onto extant divides between sociocultural groups.

Similar findings arose in Melo's (2018) study of a non-library makerspace where inclusive rhetoric masked exclusive practices sidelining women's making, in Whelan's (2018a) study of

women in private makerspaces, where she found the “consistent reproduction of old paradigms of exclusion” (p. 78), and in Eckhardt et al’s (2021) interviews with female makers in independent makerspaces. Greene’s ethnography of a Washington DC library found exclusion of both the people in the library (often people of color without fixed residences), and the activities they might wish to pursue in the computer lab. Just as in this study, Greene found the audiences of the makerspace and computer lab to be bifurcated along class and racial lines, that people in the makerspace and computer lab were largely “playing” rather than doing serious professional work, and that the librarians assisting these patrons were similarly eager to help people do the hard work of “leveling up” their skills, though:

Because the stakes are so high and the models of success in the tech sector are so unattainable, places like schools and libraries cannot help but fail in their duties. But because those duties are so important to their survival and that of the people they serve, they will inevitably keep trying. Even if the people served are further marginalized in the process. (p. 146).

Just as in this study, Greene found that precisely the people the access doctrine was intended to help were alienated and marginalized by the services they neither understood nor were invited to join.

One might expect public libraries, grounded in public financial support and philosophies of equitable access, would do better at ensuring all types of people were welcomed into the spaces. Unfortunately, this was not always the case, even though every worker clearly wanted to help others. The library that was the most convivial to the widest array of people—the Responsive Library—still did little to no outreach to communities that were not being served by the space, suggesting that some groups of people would remain marginalized. As these makerspaces and the types of making afforded by them become more expansive and well-understood in their communities, that marginalization may ease. Future studies may wish to investigate this possibility.

Public Library Creative Places Require Particular Dispositions—But Can Develop These Dispositions

Despite the charisma and “enzymatic librarianship” practiced by some of the librarians in this study, for some the conviviality of these spaces depended less on the library, but the disposition of the individual using it. Users had to be persistent, ask questions, be self-starting, and figure out things on their own. They had to feel they belonged in the space and had the capacity for making things there. While library staff occasionally held the hands of certain users—indeed they occasionally took on more than the user wanted in the name of “helping”—generally the staff had no time, expertise, or (occasionally) inclination to smooth the way for shy or anxious users. That said, some users reported significant developments in their dispositions in terms of leadership, effectiveness, and specifically empowerment. Library workers also had dispositions which did or did not further conviviality in the spaces. Hannah’s “spark of madness” encouraged people who would otherwise have not used the makerspace to try it, Nick’s willingness to answer questions encouraged reticent users, and Olivia’s active engagement with people entering the makerspace all signaled a culture of welcome and belonging to the library users. Staff dispositions of hospitality, outgoingness, trust, and enthusiasm impacted the users significantly, just as Diaz et al. (2021) found in Barcelona’s public makerspaces, and Sherrill (2020) found in a library makerspace in Minnesota.

Einarsson and Hertzum (2019) interviewed Danish library workers in makerspaces and found that, simply having the space available was insufficient to develop a culture of making. User dispositions and staff outreach were crucial. Similar to this study, they found that self-directedness was a required disposition for users to engage with the spaces, tools, staff, or makers. As one library practitioner in their study explains: “Not everyone can manage self-initiation and if not, you don’t it too well in here” (Einarsson & Hertzum, 2019, section 4.3, para. 5). Tanenbaum et al. (2013) suggest that DIY, hacking, and making have resulted in “a broad cultural shift in how people engage with technology” (p. 2604), with people taking ownership and control over technology. Andrews et al. (2021) interviewed engineering students required to use

a university makerspace for a semester-long class to see if any such shifts in dispositions occurred after using their space. Increased self-efficacy, or the sense that one can succeed at whatever one attempts, and a sense of belonging were two of the dispositional factors that they found. They found that international, multiracial, or Black students did not have an increased sense of belonging in the makerspaces, however, though white, Asian, and particularly Latinx students did. A sense of self-efficacy improved with first-year students, but not with those later in their educational programs. I found some of those shifts in this study, where users also appeared to develop dispositions related to how early they were in their maker journey. People just learning to make with new tools or processes reported a shift in how they understand themselves and their abilities. For example, new makers like Robin described an emancipatory relationship with technology and their own capacity to engage with it, while long-term makers did not.

Williams and Willett (2017) describe boundary work by library staff, some of which involves librarians crossing or easing boundaries for patrons. Other studies focus on librarian dispositions as necessary competencies for staff in such spaces. Bowler et al. (2019) describe the need for librarian facilitators:

Facilitators are essential to meaningful learning. These are the people who spark interest, attend to individuals' learning paths, create social structures that promote participation, push young people to stretch thinking, and strengthen understanding ('Background' section, para. 1).

They describe the relational practices required to facilitate this learning: reciprocity, inclusion, and offering an opportunity to grow. Similarly, Koh and Abbas (2015) highlight the need for culturally competent, flexible makerspace staff, and for the capacity to trust in the abilities and agency of the users. Their competencies of flexibility and the ability to serve diverse people could assist in developing conviviality in makerspaces. As with Koh and Abbas' and Bowler et al.'s work, this study also found that curiosity, flexibility, and cultural sensitivity, and a capacity for actively reaching out and connecting people and ideas (i.e., librarian-as-enzyme), were critical to developing the conviviality of the creative places, as was trust. Kozubaev and DiSalvo (2021) call what I term librarian-as-enzyme activities as "social infrastructuring," that

can “help establish social encounters among strangers thereby increasing the capacity for mutual support and resilience” (section 5.1, para 1) and “knotworking,” which links librarian expression into small-scale yet long-term relationships with patrons. These forms of knotworking and social infrastructuring were visible in all three creative places, particularly with workers such as Hannah, Nick, and Olivia, who explicitly described part of their library mandate as enabling connections between people. This aspect of librarianship, no matter the term used for it, needs more study to understand how and why enzymatic practices help.

Public Library Creative Places Are Convivial Tools —For Some People and in Some Libraries—And Conviviality Masks for Others

These spaces align more with the term “learning lab” than the term “makerspace.” Making is not intended to be the primary activity. As Einarsson & Hertzum (2019) found, “*We call it entry-level or learning makerspace. There you can only make prototypes*” (section 4.3, para. 3, italics in original). Yet despite the inequities and requirements for particular dispositions, the creative places DID tend toward conviviality for some young white men with a background or interest in technology, and occasionally for women and people of color. Some young people were especially well-served as they learned the tools and shared their skills and excitement. The users that felt confident in the spaces, navigated the rules successfully, and were able to create products that fell within the lines determined by the library were extremely happy with the makerspace offerings. These users described the libraries as convivial tools for their needs—they were able to create whatever they wanted, because their wants aligned with the library’s. They described a sense of happiness at being able to create things, often things they could not have created without the library offering access to some tools.

For others, the inclusive language of the libraries often masks robust limits on what is possible. Rather than being for any purpose and any person (as most library workers stated), and rather than encouraging users to reconfigure a sense of self that encourages power over objects and the tools of modern life (as seen in both the literature review and institutional narratives), these spaces simply rejigger power structures so that the library is always the one enacting the

most power. The users of the spaces fall in line with institutional objectives and values. Everyone involved in this study described a desire to attain their own goals using the spaces, or to assist others in doing so. In fact, these spaces are often covered by a “conviviality mask,” in which the library workers and users alike say the users are allowed to use the tool to their own ends in their own ways, but this is not the case. The imaginaire, or story, of conviviality is only *based* on a true story, not fictional, but also not true.

These findings were somewhat similar to Taylor’s (2004) pantomime study. In their study, such masks led to a feeling of alienation and social fragmentation when the mask was removed. In this study, only participants who were already had clear expectations of the Maker Movement’s shared governance models, or were grassroots activists, expressed such alienation. This study’s findings are more similar to what Ames and Rosner found in a child-centered makerspace, where adult coaches “scripted” activities by children to pretend children made successful repairs—a power-washed mask of STEM that decenters the children’s agency. To recenter user agency, participatory design concepts invoked by scholars such as Berget (2020), Lee et al. (2018), and Kozubaev and DiSalvo (2020, 2021) involve the users in all aspects of design and development of the spaces. These practices could ensure these spaces are more convivial for their users. In this study, the Responsive Library attempted to encourage such participatory design practices with their Advisory Board. While this attempt was seen by some as offering only “toddler’s choices” it nevertheless resulted in the most convivial of the three library creative places.

That said, not all participants wanted to have a say in what happened in the spaces. They were happy with the library’s offerings as they stood. This stands in stark difference from other studies in private makerspaces, as Sangüesa (2013) describes:

To increase the number of competent participants, to raise their technocultural critical agency, then, should be the focus and the method of any democratization process related to technoculture. (p. 6, emphasis in original)

The democratization of making that Sangüesa describes is echoed in other studies about

makerspaces, as a key factor in ensuring that these tools have broad and beneficial social impacts. For example, Barba (2015) writes that making gives, “control over sociotechnical systems to a broader group of people, effectively democratizing the tools and knowledge of technical production” (p. 639). And Johri and Pal’s (2012) Capable and Convivial design framework identifies, “Ecological Reciprocity, or the ability to enrich the environment as fundamental” (p. 67). In this study, such reciprocity and control were perceived as far less vital.

Public Library Creative Places Are Not Always Particularly Social Spaces—But Social Connections Are Desirable

While many people in this study stated that they were satisfied with using the creative places without socially interacting with the staff or other users, even these participants described ways in which other people enrich the spaces and their understandings of them. For example, users in the Productive Library, the least social of the spaces, felt a need for a book or “show and tell” detailing others’ projects to understand the possibilities of the space and tools, and because they were interested in what others were doing. The Welcoming and Responsive Library users constantly mentioned the value they saw in engaging with others through making activities either together or near one another. Yet some users made distinctions about whether they needed to engage with others to enjoy the space (no), or wanted them in the space (yes). In this study, it became clear that social interactions were not always desired, but social connections were. Some users described their need for social engagement to foster a sense of community that they valued and were valued within. Many people did not need or want to speak to one another, but they valued co-presence.

This is a distinct finding from most other studies of makerspaces. For example, the Parham et al. (2014) study of librarian making found, “The most significant technology in makerspaces is the ethos of sharing: sharing ideas, sharing skills, sharing materials. Creating ... was a profoundly social experience” (p. 3). Li and Todd (2019) and Li (2021) found children enjoying and flourishing in makerspaces, in part due to their social connections. Quite a few other studies inside libraries and otherwise claim that the social aspects of making are profound

and necessary (e.g. Bilandzic & Foth, 2013; Gantert et al., 2022; Moilanen & Vadén, 2013; Nicholson, 2019). However, Lakind (2017) also found that making in libraries was presented as a social activity, done through interdependence, but also described a neoliberal theme of and individualist product-centered conception of library makerspaces:

To many participants, making is contingent on the physical materials, but not the interactions with others, suggesting not only a goal of self-sufficiency, an individualistic notion prized in neoliberalism, but that interacting is only a human-to-human endeavor. (“Making as finite” section, para 2)

This finding was echoed by some of the participants in this study, who dismissed the need for social interactions in favor of individual efficacy. For them the social interactions were a nice but unnecessary addition to the spaces. Other studies, such as MacArthur et al. (2019) and O’Donovan and Smith (2020) find that social relatedness was or may be a key factor in makerspaces encouraging diverse gender participation or reducing a sense of intimidation or alienation from the spaces. This was true in this study as well, though that relatedness generally stemmed from the library staff, not the other users.

Non-library makerspace narratives often center the people as the most important aspects of makerspaces, including social interactions, collaboration, and co-learning (e.g. Kuznetsov & Paulos, 2010; Murillo, 2020; Sheridan et al., 2014; Taylor et al., 2016). Library makerspace literatures also forward the theory of social connectedness as a goal and practice in these spaces, many claiming that collaboration is not only a goal, but also the method by which people learn and make. Some studies have found that—much as this study determined that “conviviality masks” were in place—“inclusion masks” exist in makerspaces, and exclusion is rampant (e.g. Kohtala & Bosqué, 2014; Higgenbotham & Rouse, 2020). Similar to this study’s findings, Kim and Copeland (2019) found that rural and small libraries were less concerned with social relationships and collaboration in their makerspaces than they were simply building attendance in STEM programs:

Makerspaces generally require a different style of facilitation and tools than literacy programs. As such, librarians’ compatibility with these less familiar STEM

tools and maker practices may be low (p. 13)

As in this study, Kim and Copeland identified some libraries as focused on learning and product development as an individual activity, or incurred through library instruction rather than loose social interactions and collaboration. This was the case, in the Responsive and Welcoming Libraries. Li (2019) found that collaborative information seeking practices naturally emerged from teen practices of making, with collaborative searching, asking, learning, and tinkering activities occurring in a public library and school makerspaces. She determined that LIS professionals should assist those collaborations. One way to encourage more collaborative social interactions, suggest Kim et al. (2020), is to ensure that “hanging out” activities are structurally built into making activities and spaces. The findings of this study also suggest that supporting more casual social interactions could lead to the collaborative making valued by the libraries.

Public Library Creative Places Limit Conviviality with a “Hidden Curriculum” and Institutional Values of Uplift

Pinto and Blue (2021) describe a hidden curriculum in makerspaces and maker education, in which making is privileged over doing, work is preferred over play, and *poïesis* (making, with a goal of production) is considered superior to *praxis* (doing, with a goal of practical wisdom). They describe this curriculum, specifically in regard to children, as a way to replace play with amateur labor and circumvent the inquiry and autonomy of the child to inculcate compliant laborers. Pinto and Blue further theorize that:

Learners would be better served asking critical questions about their role in work and production, and what responsibilities employers have to them instead of uncritically assembling items without regard for their role in production implications of the objects they make, or how their participation affects the broader community of labourers ...[that furthers a] vision of praxis that concerns itself with freedom and liberation (pp. 198-199).

They theorize that forms of *critical making*, in which the maker/thinker focuses upon a relationship between culture and technology, and the possibility for subsequent embodied wisdom has a potential for social transformation and liberation. Greene (2021) goes on to call the hidden curriculum the “access doctrine,” that repositions problems of race and poverty into

problems of technology, with neoliberal agendas that must be supported by the hit-or-miss funding opportunities available to maximize limited state interventions to ensure all people had the opportunity to compete for a limited job base in technology. As he describes the provision of technologies in public libraries, including makerspaces:

For the library to maintain this hope in “using the technology to improve their lives,” as librarian Grant put it, it must necessarily regulate or eliminate competing uses for the library space. (p. 85).

This means that uses that do not align with professional, innovative, or self-improvement narratives in the space are devalued, marginalized, or out and out prohibited.

In this study, the hidden curriculum is not only evident, but library staff tend to deny that it is there. The staff do mean to be as helpful as possible. However, as Sanchez et al. (2020) found, “We had some students who worked in the iSpace who didn’t have awareness of how...paternal they came across when...they want to be really helpful” (p. 38, ellipses in original). Illich saw this sort of “helpful” paternalism as a form of radical monopoly, in which professionals prescribe solutions to problems they see, and for the purposes of replicating professional power, resulting in an “operant conditioning of their clients” (p. 29) that becomes naturalized and near-invisible. This occurred within these spaces, with professional and semi-professional library staff determining that the correct way to make involved learning skills that create more professionals. Part of the hidden curriculum of the libraries is the focus on neoliberal values of individualism, market-centered activity, the state deferring to free markets, and the assumption of an equal playing field in terms of information, skill, and capability among people to make choices based in their rational self-interest (Harvey, 2005). Harvey explains that:

The neoliberal theory of technological change relies upon the coercive powers of competition to drive the search for new products, new production methods, and new organizational forms. This drive becomes so deeply embedded in entrepreneurial common sense, however, that it becomes a fetish belief: that there is a technological fix for each and every problem (p. 68)

This entrepreneurial common sense and fetish belief, or as Greene (2021) calls it, the access doctrine, is reflected in which activities libraries privilege over others. For example, the non-ludic

orientation of these creative places is contrary to the more playful expression encouraged in many private makerspaces.

As described earlier, staff, administrators, and trustees described the creative places as convivial in that anyone can make anything they like. Then they limited that conviviality through policy decisions that encode values such as innovation and learning, and by institutional choices, such as the limitations on storage, what people were allowed to do with the tools, or who was allowed or encouraged to access them, or by spatial and practice arrangements that precluded social interactions. As in Griffis (2014) and Capillé (2018), some users felt like marginally-welcome guests in the spaces, and spatial arrangements revealed institutional control and ideologies. This occurred when equipment was arranged to make social interactions less likely in the Productive Library, and Welcoming Library foreclosed easy access to materials by adding locking cabinets to their space.

Melo (2018) discovered that sewing machines were signals of gender that some people worried would send the “wrong signal” to men in a makerspace, signaling the preferred maker media and institutional ideologies. Ames et al. (2014, p. 1089) question some of the uninterrogated institutional assumptions and values in private makerspaces: “What practices are considered to be more vs. less legitimate examples of making, e.g., 3D printing vs. quilting? Why? Who gets to make these decisions?” (p. 1089). People in this study asked similar questions: “Is it designed for the people or is it designed for the rich people...Who is this facility for? And what is the prerequisite?” (Rose, from the Productive Library). These questions must be answered, with some thought about how these makerspaces fit within the larger library faith imaginaire. In addressing such questions, the institutional perspectives on these questions shape the ability of the community to access the spaces and the impact they have on their communities.

As Hand (2005) notes, the modern version of the library faith formerly known as “moral uplift” has been replaced with the concept of “empowerment.” Just as moral uplift was about inculcating middle class values on the deserving poor, Hand says empowerment narratives center on the library knowing what is best for the patrons. Such narratives require aligning patrons’

needs with the mission of the library, rather than vice versa. This sort of uplift, whether economic or moral, has been a key component of library services since they began in the 1800s, whether the library was offering Reader's Advisory services, computer access, or makerspaces (e.g., Harris, 1972; Garrison, 1979; Greene, 2021; Leigh, 1950; Molz and Dain, 1999; Ross, 1991). The uplift orientation of these library makerspaces is nothing new. Nor are the subsequent limitations new, for the many people whose needs or desires to use the library do not fit with this uplift narrative. This line of inquiry would be valuable for future study investigating the impact of library services that are only intended to meet the needs of small subpopulations of communities, whose needs align with the services libraries wish to provide.

Similarly, in speaking about social justice in LIS historically, Mehra et al. (2010) point out a potential problem with framing public libraries economically: "Embedded in a possibly unintentional hegemonic orchestration of profit-making for their wealthy benefactors...the development of libraries was limited in their inability to become truly culturally responsive agents" (p. 4826). In this study, the focus on learning and skill building did not allow the libraries to be as culturally responsive to the non-profit-making motives of some users as they could have been. The ends of gift-giving, play, and self-expression were glossed over or considered as stepping stones toward "greater" social ends, at least in the public-facing imaginaires describing why and how the creative places were beneficial for communities. In these imaginaires, the community needed improvement, and the library knew how they needed to improve. Yet, as Teasdale (2020) points out, libraries have an equity and access mission that must drive their services, so that not only library values are reinforced, but also the users' values, which means taking seriously: "the importance of understanding makers' desired ends, which requires investigation of the varying making-related values and goals within communities" (p.2).

Chirumamilla and Pal (2013) describe problematic issues of deploying development work in information and communication technologies, aimed at groups that require "improvement," often by some other group. They remind developers of technologies that such developments "may often be loaded with unconscious pre-defined notions on the right, or desirable, outcomes

of development projects—notions that often do not represent the desires of the users themselves” (section 1, para. 7). They could have been writing specifically about these public library makerspaces. The three library creative places generally meet Chirumamilla and Pal’s first three stages in the ways “fun” has been integrated in such systems, in which:

Dismissal rejects entertainment as a useful factor in the design of ICTD projects;
capitalization takes advantage of fun to achieve other development goals;
association conflates fun use of technology with other forms of development.
(section1, para. 4, citing Kantaro Toyama)

The libraries did not *dismiss* the value of fun or expression as ends in the spaces, but they did intend to *capitalize* on and *associate* that fun with “improvement” or uplift ends. However, each library took steps (sometimes baby steps, as in the case of the Productive Library) toward what they describe as the fourth stage of development, wherein fun becomes non-instrumental or worthwhile in itself. Responsive and Welcoming Libraries were also incorporating the fifth stage, wherein people enjoy their own development efforts *as* fun. These two libraries encouraged volunteer teaching and advisory board activities as rewarding and enjoyable acts. In this way, activities of shared governance and shared expertise could potentially become fun activities, enjoyed for their own sake—for those who are interested in such activities. It would be valuable to study any public library creative places that focus more on fun as an end in itself, to see what shifts might occur for the users of those places.

Public Library Creative Places Require Social Trust

In this study, trust in the library appears predicated on the non-coercive and non-biased work that libraries offer to everyone equitably through modes of interdependent sharing, and through allowances the library makes to ensure users can meet their needs. Trust is grounded, in other words, in the conviviality of libraries. To offer a conviviality mask instead of true conviviality would likely cause that trust to deteriorate, as Caire (2009) and Taylor (2004) note. Some people in this study expressed such conclusions, which require more study to understand. If community members such as Luisa, Anthony, Xavier, and Jordan cannot trust librarians to

assist them in their chosen endeavors, they perceive little utility in using or potentially supporting public libraries.

The frustration, impotence, and exploitation that Illich (1973) mentions in interacting with non-convivial institutional tools can lead to a lack of institutional trust. Specifically, he says polarization, in which some people have more decisional power over tools than others, leads to this distrust. Institutions in the United States are increasingly perceived as untrustworthy—whether it is the institution of democracy (e.g. Geurkink et al., 2020; Williams, 2020), science and medicine (e.g. Eichengreen et al., 2021; Sibley et al., 2020), our collective action and economic systems (Audretsch et al., 2018; Novak et al., 2018; Rompf et al., 2017), and so on.

Yet public libraries occupy a special place among governmental agency; they are trusted (Ndumu et al., 2020; Vårheim, 2014), at least by some members of the community, though in light of increased book censorship requests, that trust appears to be deteriorating (Oltmann, Knox & Peterson, 2021). That trust also does not appear unanimous in light of public library creative places, and is a challenge libraries must face and are constantly negotiating (Johnson & Griffis, 2009; Smith, 2019). It may be, as the sociologists who studied public libraries for the the Public Library Inquiry (Leigh, 1950; Berelson, 1949) found, that many people in a given community do not use the public library at all, much less for makerspace services. These non-users, like those in this study, may not trust that the library is relevant to their lives or needs. Audunson et al. (2019) found that institutionalized trust was one of the most predictive factors in library use, and this appeared to be true in this study—non-users generally expressed distrust of the library or library workers. They expressed this in similar terms as Illich’s concept of *polarization*—such as when non-users believed the library staff had power to control their use of the spaces.

One way in which trust can be built can be through formalized or structured library activities, according to Vårheim et al. (2008). Another is through providing social spaces for people to engage informally (Aabø & Audunson, 2012). A third way is through allowing users a freer rein to develop and implement the projects meaningful to them, instead of framing

everything as a learning exercise (Skåland et al., 2020). And library staff can practice forms of hospitality deliberately aimed at engendering trust (Sherrill, 2020). Potentially makerspace activities can assist in building that trust—if library staff are aware of the need for trust and support it, ensuring users feel that the spaces are convivial tools.

Public Library Creative Places Are Serving Two Audiences

The institutional narratives of the makerspaces generally involved self-motivated makers coming to the library at will, and innovating new products and skills through either collaborative activities or by self-generated and/or individually pursued knowledge. The reality was often quite different. In one library, none of this occurred. In another library, this narrative did describe the activities in the space. And in the third library, the Responsive Library, this narrative was preferred, but mediating activities attempted to bridge the gap between what was and what they wanted to be. The Crafternoons and programs in this space were intended as recreational, but staff also hoped that they would shift user dispositions to become more self-directed and independent makers. The two groups that these libraries serve map onto the concepts of serious leisure and casual or recreational leisure expressed by Robert Stebbins (1982) and used by LIS researchers to differentiate library uses and information practices (Haider, 2012; Prigoda & McKenzie, 2007; VanScoy et al., 2020).

According to Hartel (2003, 2010), and Davies (2017), serious leisure involves a systematic learning experience, specialized knowledge, and significant effort involved in acquiring such knowledge and experience—though it also “enables participants to craft a sense of the self as engaged in something that has purpose and meaning” (Davies, 2017, p. 15). Recreation, or casual leisure, on the other hand, generally requires no specialized knowledge or learning, and is intrinsically rewarding, i.e., fun. The makerspace workers in this study appear to prefer serious leisure uses of the creative place even though they also want people to have fun. The institutional actors in both this study and previous ones, such as Willett’s (2018) study of an art-centered urban library makerspace, see casual use as a gateway toward more serious endeavors. However,

many of the library users and non-users were more interested in casual use in which they simply participated in a fun activity with their friends, and which they may or may not pursue in the future. Both convivial tool theory and the data of this study both suggest that reframing library expectations for more serious leisure into meeting the needs of the users—whether casual or serious—is a more equitable way to share power and to ensure all members of the community can use the tools on offer. Sometimes, as Cahill, Joo, Howard and Walker (2020a) found in library storytimes, and Barchas-Lichtenstein et al. (2020) found with other library programs, people use the library to simply have fun and interact socially.

Danish researchers Einarsson and Hertzum (2019) interviewed library workers in makerspaces to determine that casual activities in formal, structured programs can be a gateway to more informal, serious leisure. Structured formal activities scaffold learning as well as being less intimidating and have fewer social barriers than self-directed makerspace practices. Einarsson and Hertzum (2019) “As one library makerspace practitioner argues: “You could think that now the doors are open and then everyone will come. But no. People don’t. It requires a lot,” and, “We had the space open and found that there was no user need, so to say” (section 4.2, para 1). They found that scaffolding through formal and informal education was needed to assist users in developing ideas and skills, though some audiences did not want or use those educational opportunities. Einarsson (2021) goes on to report that, to sustain library makerspaces, “short-term workshops are aimed at fun and social experiences that might recruit users, whereas community-driven activities can sustain user interests and learning processes over a longer period of time” (p. 184).

However, in neither of these studies nor the VanScoy et al. (2020) study did researchers determine WHY different people might want different types of activities (formal or informal, serious or casual), other than to speak of their previous experiences. This study does. It finds that people value the inspiration, social interactions, low-stakes learning, and self-expression of formal craft and making programs. They enjoy using these programs as opportunities to spend time with friends, much as they would enjoy playing a board game or going to the movies. To

suggest that such ends are something to be bridged to institutionally-preferred goals is like suggesting that all leisure reading should be undertaken with the goal of developing particular skills, and ignoring the many other types of value people find in leisure reading. Just as reading fiction may be valued in its own right and not as instrumental for future skills, the findings of this study show that reasons for making are as diverse and important to the people making in the library. Teasdale (2020) found similarly diverse reasons in their library makerspace study and suggested honoring those reasons when assessing the success of library makerspaces.

In addition, the originator of the concept of serious leisure, Stebbins (1982), notes that serious leisure involves marginality—that by virtue of the effort required to pursue it, it will be a marginal activity in the larger world of hobbies and recreation. This implies that these spaces may never draw as large a crowd as most of the library actors wished—simply put, not everyone is interested in the challenging work of serious leisure. This is a striking contrast to the “making is for everyone” mantra that ALL the library actors elucidated in this study, as well as many of the makers themselves. In fact, the sort of making that involves a person having an idea of their own to develop and create is quite different from the type of making that is a fun activity to do once or twice with friends. These types of leisure can overlap, as VanScoy et al. (2020) found, or one may lead to another, as the library workers in this study hoped (though I saw little evidence of this occurring).

Hand (2005), who examined diverse styles of librarianship and user empowerment, sees libraries “encouraging library users to reinterpret their actions not as ‘leisure’ but as ‘learning’” (p. 378), and labels this reinterpretation as a Foucauldian act of subjectification and appropriation. Moreover, libraries expressing their preference for “serious” uses of public library services is not new. Reader’s Bureau and Reader’s Advisory services, in the first hundred years of American public libraries, developed reading lists not based on the reading interests of an individual, but on an uplift model that was both moral and educational (Dilevko & Magowan, 2007; Garrison, 1979; Molz & Dain, 1999; Ross, 1991). In the past, library directors would brag about taking active efforts to reduce popular materials circulation in an effort to further serious

uplift aims (Ross, 1991). Harris (1972) described a public library that used popular books to lure readers in with bait-and-switch tactics, and an intention to further serious educational reading. As the Public Library Inquiry study showed, this effort was in vain, with a minority of community members using public libraries, and even fewer pursuing “serious” reading (Leigh, 1950). Subsequently, over time, libraries changed their reader’s advisory services to assist the majority of users, and now recognize recreational reading as worthy of support. The issue of libraries serving different audiences or different ends is historically contextualized by scholars such as Wayne Wiegand (2015). In his historical study of statements of everyday library users in letters, newspaper articles, and memoirs, Wiegand finds that people most value and desire social connections and recreational use of their library. In this study, the libraries appropriated user desires for play, wanted them to “level up” to serious leisure and learning uses of the spaces, but as Wiegand notes, most people in the study were interested in social connections and recreational uses. Few are interested in library-generated systematic learning programs, as earlier efforts with Reader’s Advisory found.

In another example, this study found similar breakdowns of the types of social, recreational use (and socioeconomically-linked barriers) in the uses of the makerspaces as technological tools as earlier studies looking at public access to the internet in public libraries. As Balka and Peterson (2004) found in Vancouver:

For women and members of some ethnic groups, the “Field of Dreams” philosophy (build it and they will come) does not translate into Internet use in the library setting we observed – or at least not in the ways that Canadian government discourse about the Internet has suggested. (p. 152)

As in those early efforts in providing computer access to communities, people wanted to play with the technology and be with friends, rather than (or in addition to) engaging in civic or career-oriented activities. Despite what librarians prefer to believe about the “serious” reading, civic and educational uses and impacts of libraries, people want to enjoy their communities and the materials libraries offer, together. This was true in this study, though it was clear that “serious” and educational uses of these spaces were also occurring.

Public Library Creative Places Need Tools to Develop and Assess Conviviality

Library workers wanted convivial power relations, for the most part, as did most users. Not only did they describe the spaces as essentially convivial tools, but they expressed a sense that to ensure inclusion and access, they *should* be convivial. Yet due to a variety of factors, that conviviality was limited. Staff had little time, expertise, or sometimes comfort in their ability to allow for a wide range of contingencies in the making, to support diverse learning styles or practices, or to trust their users to be safe and share well. In addition, some staff internalized market logics as Kozubaeve and DiSalvo (2021) and Gollihue (2019) describe, leading to a focus on products rather than process, skill-building and learning over expression and play, and marginalizing making that exists outside market economies. As Gollihue points out, “Critical making practices that privilege electronic making will always find deficient and resistant makers in communities of marginalized people, requiring “intervention” through new media technology, despite long-standing and deeply multimodal traditions” (p. 23). Such colonization of making practice erases the reasons makers make when it does not fit market-based narratives. Furthermore, such marginalization occurred despite the library workers seeking to be inclusive.

To that end, library workers in his study described a need for simple tools to help them swiftly and easily assess their services. This model allows them to do so, with an emphasis on power and conviviality. Marshall and Melo (2020) ask excellent questions that address issues of power, who has it, and how and why it is expressed, along with many excellent suggestions for more equitably and inclusively sharing power. The Convivial Capabilities Checklist (C3) is offered as a simple tool to assist library actors in developing public library creative places that answer those questions and meet the needs of their users better—whether the users are there to express themselves, build community, learn, or meet other needs.

Just as O’Donovan and Smith (2020) use Sen’s capability approach to social justice to interrogate the capabilities supported by private makerspaces, this study uses the tensions described in the findings to determine which capabilities are crucial to ensuring the spaces are convivial, and allow the users to express their meaning in action. O’Donovan and Smith describe

six foundational capabilities in private spaces: to “to skillfully make and do...to assume and perform a valued maker identity...to establish and maintain maker community...to sustain livelihood... to modify one’s place in the world...to participate in material culture” (p. 70). In this study, seven capabilities are identified, few of which overlap with those O’Donovan and Smith propose. Only the Capability of Coexisting and Connecting aligns with their “capability to establish and maintain maker community.” Interestingly, the desire they describe to build maker community was not as visible in this study, suggesting that library makerspaces differ from private makerspaces. This would be an area worthy of further research. However, one could also see their “capability to assume and perform a valued maker identity” as part of this study’s Capability of Understanding (Oneself and One’s Needs in the Context of the Space). Their list focuses more specifically on the techniques and know-how of making and forming a maker community than this study, which seeks to see how one might ensure the makerspace is a tool that forwards agency to the user to be used as they decide.

This study’s C3 heuristic is itself intended to be a convivial tool, usable by both scholars and practitioners, within libraries or in a larger conversation about public organizations and shared tools. This model is not THE end, but AN end. It intends to be pragmatic, fungible, and usable in an array of circumstances. It is intended to be a series of disorienting (and reorienting) questions about who has the power to do what while interacting within public institutions. As Sen (2009) notes, these capabilities will be negotiated in each context, according to the shared values of each instance.

This amended model can assist practitioners in evaluating not only public library makerspaces, but potentially other information or social service systems that aim at conviviality. Moreover, this model and the findings of this study offer a theoretical framework to understand power processes in public libraries. The model incorporates several types of power and information science theory:

- expectations of resistance and “weapons of the weak” (Scott, 2008b) or Certeau’s (1984) strategies and tactics;
- discipline, governmentality and power/knowledge (Foucault, 1977, 1980; Foucault et al.,

- 1991);
- sensemaking (Dervin, 1998);
- access as described by Mathiesen (2009, 2014), Oltmann (2009), and Burnett et al. (2008);
- social spaces and social trust formation described by Vårheim (2007, 2011, 2014) and Jochumsen, et al. (2012), and Griffis (2013);
- and the serious leisure work done by Hartel (2003, 2010); Prigoda and McKenzie (2007); VanScoy et al. (2020).

Each of these theories were visible in the findings of this study.

Limitations

In this study, the framework of conviviality is leveraged to communicate the encounters of people, machines, and institutions, as well as building on the descriptive power of the theory based on those encounters. Ilich (1973) cautioned his readers against the “idolatry of science” (p. 100) in which theory trumps actual experience. He said that a convivial tool—including scholarly theories—should be easily useable by anyone for the purposes they deem significant (p. 35). Therefore, this study is intended to provide descriptions of particular practices and discourses in particular public library creative places. It is then intended to both apply the descriptive power of conviviality theory to explain these practices and discourses, and to strengthen the theory based on what occurred in those spaces. Yet embedded within the C3 model I propose is a fluidity, an ability to create the theory based on the circumstances of “spontaneous encounters” within a “social and historical context,” or at least a moment in time. Similarly, this model is negotiable, as Amartya Sen (2009) frames the Capability Approach to social justice:

The capability perspective is inescapably concerned with a plurality of different features of our lives and concerns. The various attainments in human functioning that we may value are very diverse... The capability that we are concerned with is our ability to achieve various combinations of functionings that we can compare and judge against each other in terms of what we have reason to value. (pp. 233)

In other words, the model may apply differently, with different emphases in diverse situations, and this is a feature of the model, not a problem. Still, it is a limitation on how transferable the findings may be in other situations.

The limitations of this study also emerge from the ways the data was acquired and

analyzed. For one example, I guessed at racial and ethnic affiliations in an effort to avoid alienating potential participants and be sensitive to the challenges of racial discussion. This limited their agency to self-identify. While library staff might make similar guesses as I did, with any subsequent racial biases emerging from those guesses, the fact remains that I do not know how most of the participants would identify themselves. Since both research sites and participants were convenience-sampled and self-selecting, different makerspaces and participants may report different logics, power enactments, or practices. The analysis of the power practices in the data (interviews, institutional resources, fieldnotes) was also funneled through one researcher, with a particular worldview. The best way to establish the reliability of the analysis is check them with the participants themselves: the findings chapters were sent to each research site with a request for clarifications, amendments, explanations, or counter-narratives. I presented early findings to one library's staff, with the comment, "It was just what I was hoping for. A big dose of 'why'" (Justin, personal communication, 3/1/2018), but there was no pushback or further engagement. Few people responded to these drafts, and none amended my interpretations. The absence of deeper participant engagement with the findings is a limitation of this study.

A further limitation on the data and analysis derives from the span of time the writing of this dissertation demanded. While the data was gathered in 2016, a couple of years intervened before the participants could read early drafts of the findings, and more time until they could read more developed drafts. During that time, practices may have changed in each space. The interpreted realities I report here are situated in a particular time, and must be read as such.

Recommendations for Further Study

In part due to the limitations outlined above, I have several more recommendations to further inquiries into power in public library creative places. First of all, since this is data from 2016, this research needs to be updated, with in-depth qualitative exploration and quantitative assessments of the findings. In addition, each of the conclusions listed in this chapter offer potential branching off points for future research, looking at inequities, dispositions, conviviality

masks, social interactions and connections, the two audiences for makerspace services, and social trust, as well as establishing the utility and transferability of the C3 model. This study's findings pose an additional series of questions, some of which I will lay out here as potential pathways for future research.

- Should libraries reframe the spaces to meet user needs, or should they do a better job of conveying the relevance of the needs they have deemed appropriate for these spaces to address? The latter may be less convivial, but may better align with institutional goals and values. Future studies could interrogate user satisfaction with spaces that are more or less convivial.
- Should libraries renegotiate how these places are supported in discourse and practice? For now, these spaces are almost exclusively funded by donations and grants, rather than the library's tax-supported budget. Does this lead to a diminishment in the institutional values of access and equity in favor of more corporate goals? A closer examination of the funding of these spaces could reveal narratives or practices that reduce or further conviviality for the users.
- Illich stated that, "Rationally designed convivial tools have become the basis for participatory justice" (p. 25). What occurs in spaces that are explicitly designed as convivial tools? Future studies could examine any shifts that occur for users, communities, or the libraries.
- The concepts of conviviality themselves require more interrogation. For example, was the apathy I saw in many users regarding participatory governance a result of what Illich (1973) calls "overprogramming?" When faced with questions about possibility of changing the library's policies or practices, many people mentioned they never thought of doing so. Is this because the library has a radical monopoly that Illich believes "turns people into the accessories of bureaucracies or machines"? (p. 12). Qualitative studies on how people position themselves relative to authoritative institutions like libraries could inform LIS research and practice on how to best serve community needs or restructure library services to ensure a sense of user agency.
- More research needs to be done on participatory governance and design, and in understanding user needs and impacts around knowledge-sharing and communities of practice in library makerspaces. This was the most tenuous of the findings of this study, with a strong divergence in what people wanted and valued in the spaces. It may be that in other cases, a clearer consensus will emerge. For now, I am comfortable stating that social making and the ability to share of oneself is critical to these spaces in part because the participants espousing these views were among the most consistent users and most active in making, or such social sharing was a necessary component of their making. But this may be a factor that only aligns with serious leisure uses of the makerspaces. More casual users may have no need at all to participate in the space at a deeper level. If a library offered deeply participatory shared governance in a creative place, what would happen to the users, community, library, or the types and depth of making?
- Issues of serious and casual leisure also need further research. If these spaces are to reflect the needs of the entire community, then we need to know the extent to which each of these types of leisure should be supported. We also need to know if there is any truth to

the regularly-invoked idea that casual leisure activities act as a gateway to serious leisure activities. VanScoy et al. (2020) have begun to establish the various types of leisure activities libraries support, using the Serious Leisure Perspective. This work should be continued in makerspaces, but more importantly, research and theorizing are needed to establish the outcomes of each type of programming and how they fit in the library's access and equity narrative.

- What role does education and disposition play among the staff? Does a lack of library-centered education pose problems in these spaces? Most of the workers in this study lacked a Master's of Library Science (MLIS) degree—sometimes purposefully, as when Chuck said he tried to hire people who were not “library types.” Hannah described intellectual freedom issues as “too deep” to delve into, and lacked the MLIS degree. Will the access and equity foundations of LIS erode if non-librarians are developing and staffing these spaces? It was clear in this study that user and/or staff disposition critical to success in these spaces, but to what extent is this the case?
- What about enzymatic librarianship—what precisely are the competencies of enzymatic librarianship? How much does the librarian-as-enzyme form of social scaffolding and knotworking help? Does it assist those who are *not* cisgender white men to establish a base in these spaces, increasing inclusion and equity?
- What practices best serve users in terms of sensemaking in these spaces? Do signs help? What sort of manuals, guides, or marketing materials best assist user understanding, and which help build more inclusivity in the spaces? In this study, the framing of the spaces and what they were for profoundly affected the participants in this study. Is that true across the board?

All of these questions will likely require further qualitative study, but determining the extent to which various factors impact participants could also be assessed quantitatively.

In my own future research, I intend to continue work on the Convivial Capability Checklist (C3) to see how applicable the model is. I intend to do a large-scale quantitative study to see if and to what extent each of the capabilities is met or desired in public library creative places. As that model is developed through feedback in quantitative studies, I anticipate doing research to find out if it is useful in other library or community informatics research. Cabitza et al (2015) described ways to use social metrics to measure conviviality, for example. Illich says we need “a common language for people in opposing parties who need to engage in the assessment of social programs or technologies, and who want to restrain the power of man's tools when they tend to overwhelm man and his goals. Such a theory should help people invert the present structure of major institutions” (p. 11). I intend to do research to see how the C3 can offer libraries and potentially other information institutions that common language.

Implications for Practice

The findings chapter and this discussion offers ideas for practitioners to consider, and I have already presented these findings to one of the fieldsite libraries, and will continue to present and publish the findings in professional publications such as *Library Journal*. They may choose to respond to the findings with a variety of shifts in providing makerspace services, including ensuring both serious and casual recreation users are supported, developing more active outreach to marginalized populations, and spatially and structurally ensuring social interactions can easily occur. The tensions illustrated in the findings chapters describe the unevenly available capabilities that the stakeholders deemed important or necessary to be able to recognize their own power and agency in the creative places. These capabilities can be more equitably shared, so that the spaces, tools, and communities in them are more convivial for a greater proportion of the community. To enlarge “the range of each person's competence, control, and initiative, limited only by other individuals' claims to an equal range of power and freedom” (Illich, 1973, p. 12), libraries can support active mastery through outreach, assisting sensemaking, enzymatic librarianship, and social learning and making.

The American Library Association has created a series of statements regarding the rights of the users. Alongside the professional rights and responsibilities to make library decisions, users have the right to decide for themselves which materials, services, and programs they wish to use, and to what end (ALA, 2004). All people deserve equitable access to whatever they choose to engage with at the library, without librarian biases getting in their way (ALA, 2010). These tenets reflect foundational policies advocating intellectual freedom and access, and are encoded within the ALA Library Bill of Rights, library mission statements, and other professional rhetoric. By directly linking decision-making processes in creative places to mission statements and the principles of librarianship (such as overall library tenets of equitable access and intellectual freedom, as well as inclusivity and outreach), public libraries can better ensure that the spaces are tools that serve their communities' needs.

Conclusion

I began this study with a question about the term “empowering” and what practices, positions, and people were hidden within it. At the time the study began, no one in the library literature appeared to be asking similar questions, though over time, more critical engagement with this concept arose in the general making literature (e.g. Bardzell et al., 2017; Diaz et al., 2021; Eckhardt et al., 2021), and the LIS literature (e.g. Marshall & Melo, 2020; Teasdale, 2020). Through ethnographic engagement comparing three diverse public library creative places, I traced how power was enacted, held, hidden, distributed, and denied, according to the people using and developing the spaces. Along the way I discovered a desire and intention to provide the spaces as convivial tools, in which, as Jenna stated, “anyone can do anything.” I further discovered that the spaces were not generally convivial in practice, with many tensions forming barriers to the use of the spaces for some people.

I was surprised to find internalized market educational logics so prevalent in the institutional narratives of the spaces, and that most users also internalized these logics, dismissing their own uses of the spaces as somehow trivial. This trivialization is evidence of the overprogramming Illich (1973) describes. It is also an expression of what Giddens (1984) describes in the duality of structure—that users have power to shape the structure or tool they are using, by legitimizing or signifying the value of the tool in the context of their own needs. In this case, the users enacted power by reflecting and reinforcing the market ideologies and learning narratives that the libraries expressed. Even so, the participants wanted to use the public library creative places as tools to further their own goals, whatever those goals were.

Ivan Illich (1973) calls for a society in which people used tools to live together harmoniously, in freedom and mutual care, using “technology to make the most of the energy and imagination each has, rather than more well-programmed energy slaves” (p. 23). To this end, he says we need “institutions [that] are functional when they promote a delicate balance between what people can do for themselves and what tools at the service of anonymous institutions can do for them” (p. 99). He went on, in *Shadow Work* (1981), to describe a convivial utopia, in

which:

Both wage labor and shadow work will decline since their product, goods or services, is valued primarily as a means for ever inventive activities, rather than as an end, that is, dutiful consumption. There, the guitar is valued over the record, the library over the schoolroom, the backyard garden over the supermarket selection. There, the personal control of each worker over his means of production determines the small horizon of each enterprise, a horizon which is a necessary condition for social production and the unfolding of each worker's individuality. (p. 14)

While Illich describes the problems he sees in consumption, shadow work, non-convivial tools and “expert” institutions, he deliberately does not create a how-to manual in crafting a convivial tool. But our institutions could likely use such a manual. LIS scholars such as Teasdale (2020) and Marshall and Melo (2020) have begun the work of creating metrics by which power may be assessed in makerspaces, though they did not use Illich's theory. Some theorists, such as Johri and Pal (2012) and Cabitza et al (2015), started to create an Illich-centered “engineering manual,” with a list of ways in which convivial tool theory could be implemented in the field of information technology development. This study expanded and reconfigured Illich and Johri and Pal's work, by grounding it in the practices and discourses in public library creative places. By tracing enactments of power from user to institution and back again, this study bridges the gap in this existing conviviality theory with a model that can be used in a variety of cases in libraries and potentially elsewhere. This model could be used as a simple checklist to examine the conviviality of classification systems, websites, spatial arrangements and other aspects of library and institutional service. It could be balanced against the social metrics Cabitza et al. suggest. This is the beginning of a manual for how to develop convivial tools.

The study was what Illich (1973) labels counterfoil research, in which I examined the relationships of people to their tools with the intention of understanding the social relationships these tools impose. The findings show that libraries have the capacity to ensure many of these capabilities, and do support them—for some people and purposes. Those purposes do not generally involve in-depth making, but rather learning to make. These spaces thus align more

with the term “learning lab” than the term “makerspace.” Making is not intended to be the primary activity. Future researchers and practitioners now have more information about the lived experiences and power enactments of users and library workers in public library creative places, as well as ways in which convivial tool theory and the Convivial Capabilities Checklist may be able to help in allowing the user “to express his meaning in action” (Illich, 1973, p. 35).

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Appendix A: The Cases

Welcoming Library

Welcoming Library is located in the Northeast of the United States. It has a comprehensive makerspace intended for at-will use, including a woodworking shop. I spent 134 hours over the course of four weeks in this library, and interviewing 19 community members with extensive semi-structured interviews, and an additional 18 more informally, or I observed them (with consent) during the month of April 2016. I spent many additional hours in the community becoming geographically oriented, comparing it visually to other nearby communities, using various local businesses, and living my life among the residents of the community and those nearby. I resided in a nearby, larger community. However, I made sure to shop locally, attend local events, and eat and drink at local venues to get a sense of the community.

The Town and Village

The town and village of “Welcoming” is located an hour from two different urban centers in a Northeastern state, not far from the Canadian border. Some residents consider it a bedroom community to the closer urban center (Vivian), others consider it a crossroads on the way to many places (Ruth), while others consider it simply a small town (Hannah, Dale, Sue). The United States Census makes the distinction that there is both a town, population 6,680, and a village, population 1,850 (US Census Bureau, 2022). It lies just south of a major toll-road that connects many of the larger municipalities in the region.

The downtown corridor of the town and village of Welcoming is quintessentially “small town,” with brick and stone storefronts lining the street. The streets are wide and sparsely populated. The homes are often small, on large grassy lots. The local grocery store is a tiny storefront with a deli attached; for more substantial shopping residents travel to the next town over, or further afield. The three linear blocks of downtown Welcoming hold a wine bar, along with a couple of other bars and restaurants, insurance agencies, a bank, the town hall, a post

Figure 19 Downtown

office, and a residential facility for older adults. Much of the other businesses are dispersed throughout the community, with gas stations, dollar stores, auto dealerships, and schools located on the periphery of the town.

Historically, the people of the Seneca nation are native to this area, and they sold their land in a much-disputed treaty for £2,100 (McKelvey, 1939). The town was settled by its first non-Native American inhabitants in the late



1700s by veterans of military expeditions and the Revolutionary War (*History of Ontario County New York*, 1893). The town has a 96.5%³⁴ white non-Latinx population, with 1% people of Latinx descent, and 1% of African-American descent. The population growth the area saw in the 1950s to 1970s has dwindled to almost nothing, with a loss of 2.6% of the population between the 2010 census and an estimate in 2016. 17.5% of the town residents have a four-year degree. The median income is \$58,500, and 10.5% of the population lives in poverty (U.S.Census, 2015). It, like many of the rural communities nearby, has suffered significant economic losses, especially with the closing of local agricultural processing plant (Hannah). Community members describe a sense of losing or missing out on the opportunities available elsewhere (e.g., Hannah, Stanley, Dale, Faith). Most of the major manufacturing jobs in the area are located in the nearby town of C, rather than in Welcoming, leading to a sense that the C library is much better funded than the Welcoming library, due to the tax dollars and donation support from these manufacturers (Hannah).

My local informants, who were not affiliated in any way with the town or village of

³⁴ All census-based numbers are rounded to protect the anonymity of each case. Numbers are rounded to either the nearest 1,000 or the nearest half a percentage point, depending on the scale of the number, unless otherwise noted, or to the nearest half-year.

Welcoming, or its library, included two of my husband's family members (Maureen, Leon). They oriented me to the local culture and history, provided commentary on the reputations of the local towns, their experiences there, and the nearby cities. While these informants stated that they considered certain nearby communities as "artistic," "struggling," or "winery country," they had no sense of the type of community Welcoming was, even though they lived only 30 miles away and had spent time in other nearby communities. They had never visited Welcoming. However, they knew that both of the cities near Welcoming were blue-collar working-class cities that had suffered significant economic trouble with the closing of several major industries in the last decades. This characterization was echoed by several participants (Hannah, Sue, Vivian, Travis). Those cities were in the process of reviving, with new cultural and tourist development regularly being highlighted in the local news. The cities were home to several universities.

The Library

This library is an association library established by the Town of Welcoming and its neighboring community of "C" in 1963. In New York state, this means that a certain funding structure is in place, where a taxing body can charter a library for the use of its communities. In this case, the library was contracted to serve the school district, which encompassed the village and town of Welcoming and the town next to it. The library was chartered to serve 11,506 residents.

A board of seven community members oversees the library. They met monthly to discuss policy and planning for library initiatives. The members of the association, i.e., the town residents of Welcoming, officially elected the board trustees. Trustees may serve up to three terms of three years each. However, the trustees are, in practice, selected by the library manager or other trustees. To locate a new trustee, they approach library users to run for the office. Three of the seven trustees reside in the town of C, rather than in Welcoming itself. The trustees are all white and middle-aged, with the exception of the board president Megan, who is in her early 20s. Four of the trustees are either teachers or affiliated with the schools. The others are either professionals

or, in the case of Megan, a university student.

The library is housed within a former elementary school building. This building houses the village clerk's office, the economic development and tourism office, the community center, and several small businesses such as a daycare, a dance studio, and a dojo. The library occupies the middle of the building, and involves several adjoining "classrooms" in the former school. The library moved to this community center location in 2005, under the leadership of the previous library manager. Previously the library had occupied a stand-alone building, a former church downtown. It was unclear, during my time in this library, where it was located. A lack of signage meant that I wandered the village, and later the halls of the community center, wondering if I were in the right location. A door with a window leads into the library, and is flanked with a large bulletin board advertising the library's makerspace. The rooms are strung together in a long narrow band alongside the central corridor in the old school. The main room, where the entrance to the library is, occupies one classroom. It is decorated in soft terra cotta and chocolate tones, with a warm and welcoming leather sofa area, a circulation desk, and several table seating areas. The staff offices are located off of this room.

The library splits off to both sides from this central room. To the right are two more classrooms. One houses the general nonfiction collection and a restroom, and the next houses a program and seating area as well as the local history materials. This room is often filled with seniors playing cards. To the left of the main library room, one travels through the densely packed stacks of the general fiction area, then a small teen area is decorated in dark tones and industrial-style fixtures. The next room is the children's' area, a green open space with low shelves on one side and taller shelves on the other. The children's' area walls are covered with tree murals and a toy kitchen and other play areas nestle among the picture books.

Throughout the library vintage and industrial lights and knickknacks decorate the space, making it feel homey and non-institutional. Such a comforting and homelike affect was sought by library manager Hannah. In fact, she has done interior design work previously, and was hired to do design in other areas of the community center as well. One of her first acts as the library

manager was to host a “sponsor a paint can” program and painting party to transform the library away from a grim, 1960s institutional aesthetic (Hannah, Sue). In all areas of the library, users are able to rest and socialize with these group seating arrangements, and often they are filled with people playing cards, talking about their lives, or just hanging out. To enhance the sense that the library is a home-like space, the library has several pets, including two guinea pigs and a chinchilla. After I left this space, they also acquired a cat.

The Funding

The funding for this library was complicated. The library derived most of its funding from a school district tax (\$49,500) and from the village of Welcoming’s taxes (\$45,000), as well as some of the town of Welcoming taxes (\$25,000). The library had asked for the town of Welcoming to increase their support, since the community explicitly chartered the library to serve the residents of the town, but some confusion about how the library was funded appeared to preclude any additional support from the town (Stanley, Hannah, Sue). In 2011, a proposition to permanently fund the library through the Town of Welcoming tax dollars failed. This proposition would have provided a \$175,550 budget for five years, guaranteed by the town of Welcoming. As it stands, the Town of Welcoming only gives money “because the library board of trustees literally begs for it every year” (Swanson, 2011). It is essentially a donation.

Additional monies were garnered from fundraising and donations, as well as investments of donations, and library charges, such as overdue fees. The total income for the library in 2015 was slightly over \$150,000. Transfers from investment funds allowed the library to disperse about \$180,000 in operating and capital funds in 2015. State “Bullet Aid” grants totaling \$25,000 funded the creative place itself, in 2014-2016. This was a grant distributed by the members of the state senators in their districts, aimed at economic and social revitalization projects in libraries, schools, and police departments. In addition, the library collected matching funds to the Bullet Aid grant by a local foundation aimed at supporting the Welcoming community. Hannah and Sue described the senator for the community as a library supporter, and his mother was a

librarian (Hannah). Many of the elected officials that govern this area were Republican, from the town supervisor (Stanley) to the state senator.

The Staff

Four women comprised the entire staff of this library. Hannah, the manager of the library, was a striking woman in her early forties, with a background in music, art, and performance. She came to the library from work as a preservation specialist in a nearby university library. In 2013, Hannah became the lead administrator of this library. She was responsible for the budgeting, collection development, policy development, interacting with the board, community outreach, and a variety of other tasks. She did not have a Master's degree in Library and Information Science. One of the most noticeable things about Hannah is that she is extraordinarily charismatic—her charisma draws people to engage with her, and her enthusiasm about her library is energizing and compelling. The Library System awarded the honor of “Director of the Year” to Hannah in 2015. In 2017, she received a statewide Award for Distinguished Librarianship by the state library association.

Sue was the assistant manager. She had worked at the library for 13 years, was in her mid-50s, and was the main person responsible for the information technology at the library, teen programming, and a variety of other tasks, including marketing, collection development, and cataloging. Louise, who was also in her mid-50s, acted as the bookkeeper for the library, as well as doing many different collection maintenance tasks. She had worked at the library for over a decade. Pam was the children's library specialist and had worked at the library for 11 years. She was in her late 40s or early 50s and worked the fewest hours of any of the staff. She ran the children's storytimes and summer reading programs. All of these staff members did the reference, circulation, and user interaction work at the front desk, though Hannah did that work more rarely than the others.

None of the staff members had a master's degree or any experience with libraries prior to working at the Welcoming Library. Nor did most work full-time—even Hannah only worked at

the library for 30 hours per week until just before I arrived at the library, when the trustees approved a full 40-hour a week assignment for her. The full-time equivalencies (set at 30 hours a week) of the staff was 3.24.

The requirements for managing an association library of this size do not require any form of certification or classes in library science for the library manager. Key issues taught in librarianship coursework in other states or in an MLIS program, such as intellectual freedom and privacy issues, were not explicitly taught to the staff in this library, nor were these issues under much consideration when the library formulated policies about the makerspace (Sue, Megan, Hannah). Instead, staff learned these foundational tenets of librarianship, perhaps imperfectly, on an *ad hoc* basis. The library has implemented policies that note that they honor the ALA Freedom to Read and Library Bill of Rights. Some of the staff here were not conversant with these tenets of librarianship, or did not think of them in the context of their creative place access (Pam, Hannah). Others had complicated relationships with the concept of patron privacy (Sue, Louise, Pam).

The “maker” credentials of two of the staff members were significant. Hannah was a musician, artist, designer, bookbinder, and spent her childhood years assisting in her father’s fabrication business. She could weld and considered herself a maker and creator. She taught herself things such as electronics and 3D printing through hands-on experimentation. In many of the photos published by the library, Hannah operated heavy industrial woodworking tools in the library’s creative place while immaculately attired in a dress and heels. She took pride in the fact that she was willing to drop anything to help someone make something, and in her own ability to learn on the fly through trial and error. Sue had similar credentials. Raised by an avid gardener mother, Sue made a variety of craft and arts, and embodied a spirit of DIY in her professional and home life. She also knew how to weld, do woodworking, and considered herself a maker. While Hannah looked like a young creative professional, Sue had the appearance and demeanor of a slightly older self-proclaimed “hippy.”

Community members appeared impressed and pleased with the work being done at the

Welcoming Library. Several participants spoke of the welcome changes made by Hannah after her predecessor left, who several participants viewed as inflexible and “old fashioned” (e.g., Sue, Dale, Stanley, Lisa). Even those who did not use the library in any way, or entirely understand what occurred there, spoke highly of the library’s and the library manager’s reputation (Garrett, Stanley). Hannah, especially, was well-liked and respected by members of the community (Lisa, Andrea, Stanley, etc.)

The Creative Place

The library’s creative place was available for use to the public for over a year when I arrived there for this study. It had existed for another six months prior to that, and was used only for programming until the library could complete careful writing of policies and procedures. The grand opening of the space for public use was in February 2015. The creative place itself was at the end of the long snaking row of former classrooms. It was a 600 square foot space accessible through double doors from the children’s area. It was not clearly visible from the entrance to the library or the circulation desk. One had to enter the children’s library to see the space. The doors had a small window, and were labeled with the logo for the creative place. These doors were often closed, and/or the lights in the space were turned off. Many of the tools in the

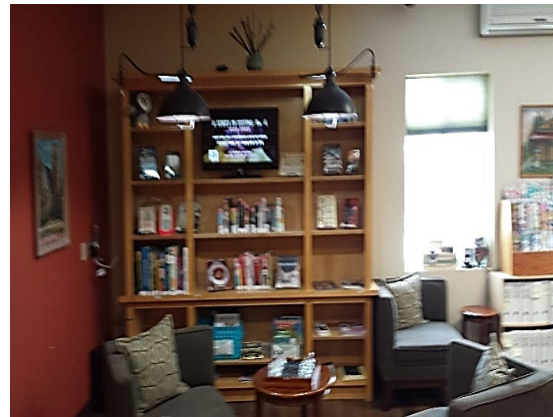


Figure 20 From top: the seating area directly in front of the entrance door; the entrance door from the outside of the library, in the community center hallway; one of the several maker boxes strewn around the library to encourage making.

space, by the end of my month in this library, were hidden away in large, unlabeled, lockable cabinets. The wood working equipment, 3D printer, and vacuum system were all visible, however.

The library advertised its creative place through outreach to various community organizations, tours, and through regular newspaper columns and social media. Outside the library was a tidy and coherently designed bulletin board advertising the space to anyone who walked past the library door. This bulletin board was in strong contrast to the more haphazard bulletin boards that were covered in community notices in the rest of the community center. In addition, throughout the library were small boxes filled with creative materials, intended to inspire impromptu acts of creation. These boxes allow people in all parts of the library to draw, color, or knit. Many rack cards, displayed next to the circulation desk, also describe the library's programs, services, and activities. A large computer monitor in the main area of the library displayed electronic notices of the various activities available to the community, with most notices discussing STEAM activities. However, many library users seemed unaware of the signs, programs or activities, despite this barrage of advertising (Hannah, Ruth, Sue, Garrett). At the same time, those people in the know regarding library programs were quick to sign up for the often-limited programs, and most program's capacity was very swiftly filled.

Tool List

The space comprised both "clean" (3D printer, electronics, sewing machines) and "dirty" (woodworking) technology tools.

- Lulzbot Taz 5 3D printer
- Littlebits kits
- Circuitscribe kits
- Lego Robotics kits
- Snap Circuits kits
- Arduino processor kits
- Laptops & tablets
- Wacom drawing tablet
- Large format printer flatbed scanner
- Apple iMac computer
- Drill press & drill bits
- Wood lathe
- Scroll saw
- Chop saw/powered miter saw
- Circular saw
- Miter box
- Wood router
- Sanders (palm, orbital, belt)
- Handheld jig saw
- Dremel tool

- Microscope
- Biological slide set, blank slides, & cover glass
- Physics solar workshop kit
- Magnifying glasses
- Mat cutter
- Cutting mats
- Cricut machine and dies
- Paper crafting tools: various scissors, rotary tools, punches etc.
- 24" board shear
- Scalpels & X-acto knives
- Mold & deckle for papermaking
- Sewing, quilting, and embroidery machines
- Musical keyboard
- Calculators
- Rulers and squares
- Safety equipment (such as ear and
- Jeweler's tools and findings
- Beads
- Metal punch alphanumeric set
- Soldering station
- Legos
- 35mm film to digital convertor
- Hand tools (including hammers, wrenches, screwdrivers, hacksaws, & many more)
- Easels
- Staple guns
- Nikon digital camera, with 18-55mm lens and 55-200mm telephoto lens & Tripod
- eye protection) and first aid kits
- Materials for a wide variety of crafts and making

The Participants

In this case, I recorded 17 in-depth interviews; held 2 longer interviews with notes and no recording; did an additional 17 brief interviews with notes; and observed 25 people in the space. Below are all of the participants in this case, with the key informants in the finding chapter narratives highlighted in red.

Table 9 Welcoming Library Participants

Pseudonym	Role
Abby	felting class participant, young mother, white, perhaps 30
Andrea	Foundation president, white, about 35-40
Cassandra	felting class member, mother of Dahlia, white, about 30
Colleen	woodworking participant, white woman late 40s
Dahlia	young participant in felting class, daughter of Cassandra, white, about 8
Dale	ex-trustee, janitor, user, photographer, white, 50s-60s
Eva	felting class participant, white, late 40s
Faith	mid 30s white nonuser of space, but whose partner had used it
Frank	older library user, history buff, non-user of space, white, 70s
Garret	Non-user of library, truck driver, older white man
Gina	felting class participant, white, late 40s
Hannah	Library Director, white, early 40s

Jerry	3d printing class participant, white, late 40s
Jonas	literacy council leader, white male late 30s
Julian	woodworking teacher, brown skin and hair, 50s
Leon & Maureen	local informant brother and sister-in-law, white, early 40s
Linda	felting artist, program participant, white, 50-60s
Lisa	Director of Community Center, white, 30-40s
Louise	Library Bookkeeper, white 50-60, did not participate in the study
Margaret	felting class participant, white early 40s
Megan	board president, white, early 20s
Oscar	3d printing class participant, mid-late 30s white
Pam	Children's librarian, 40s white
Powell Foundation	the pseudonym for a local grant foundation named after a local person who wanted to develop the community's downtown
Renee	non-interviewed trustee, white, 40s
Robin	Library System staff member, female, white, 40s
Ron	non-interviewed trustee, white 30s
Reuben	user (at least, he did participate in a program), white, late 40s, critic
Russell	White, 30-40s woodworker non-user of the space
Ruth	head of tourism in P, white 30s
Spencer	person who runs a makerspace in a city university, unknown race or ethnicity, 40-50s
Stanley	city manager, white 60-70s
Stella	trustee of P library, of regional library system, and on state trustee board, white, 50s
Stephanie and Ted	Couple, white 40s, both trustees
Steve	teacher at local high school interested in makerspaces, white 30-40s
Sue	Library 2nd in command of makerspace, white, 50s
Tammy	felting class and 3D printing class participant, white, late 40s
Tim	3d printing class participant, white, 40-50s
Travis	teacher of 3d printing, white, 40-50s
Veronica	3d printing class participant, white 40-50s
Virginia	felting artist, white 50-60s
Vivian	younger felting class participant, works in R_City, white, 30s
Wendy	trustee, local teacher, white 50s
Yolanda	woodworking participant, female unknown racial or ethnic identity, late 40s

My relationship with the staff in this space became very friendly, as they were warm, welcoming, and inclusive. Participants invited me to parties and events outside the library, including to the homes of the library manager and the mother of her assistant—who even invited me to stay rent-free at her home (I declined). Only one staff member was reticent to speak with me, Louise. The city officials, partnering organizations, and trustees were happy to participate in the study.

General Practices of the Creative Place

In Welcoming Library, no staff inhabited the creative place on a regular basis. Instead, Hannah or Sue provided tours and training sessions as needed and as the staff was available. Hannah would regularly drop everything to assist someone in the space. Hannah did outreach in all types of situations, from one-on-one conversations in the grocery store to hosting a booth at local festivals to doing coordinated activities with local schools. Much of her work occurred outside the library. Though Sue sometimes assisted users in the space, or offered tours, the other two staff members were barely involved in the makerspace. Training occurred *ad hoc*, with Hannah or Sue demonstrating the use of a tool, then signing off on the user as “informed” about its safe and proper use.

Technically, the space was open for use by people older than 7 years, although the library expected anyone under 18 to be accompanied by an adult, which severely limited use for teens and children. The space was open whenever the library was open, unless a program was occurring in the space. However, during my month in Welcoming, it was used almost exclusively during programs or meetings that were hosted by the library. The authorization process here was somewhat informal. In fact, it was never quite clear what those processes included, as I never observed a user needing authorization. Ostensibly, if a user wishes to use the more dangerous or delicate tools in the space, either Hannah or Sue need to train and observe them in the safe use of the tools using a checklist of safety hazards and best practices. These hazards and guidelines are contained in the lengthy policy manual. Users must sign liability waiver and user agreement forms to use the space.

Hannah and Sue hoped that the space would become self-populating, that users would simply enter the space and work on their projects at-will, with little to no oversight or assistance by the staff. While I was there, this occurred precisely one time: when Cassandra and her young daughter Dahlia visited me in the space to work on felting some animal toys from wool. I was a “maker-in-residence” as well as a researcher in this space. As part of my participation there, I led a series of four workshops on felting with wool. The fiber artists of the community welcomed me,

and visited me in the space.

The library provided space, tools, and regular programs. It was up to the users to use them or not, the library staff said. The staff wanted a community to spring up in which members supported one another, because the library did not have the funds to staff the area. Most of the programs were run by local volunteers. Often, little help was available from the busy staff, though the low usage of the space precluded much need for help.

Programs in the space were generally arts-and-crafts oriented, reflecting the community's requests. Fiber art was popular, as was woodworking, jewelry making, and other craft projects. Such programs filled up with participants very swiftly, and there were waiting lists. Other programs, such as homebrewing beer, had few or no participants (Hannah). More advanced making programs, involving technologies such as 3D printing and Arduino microprocessor programming, were also well-attended.

Productive Library

I spent 138.25 hours in this library's creative place, or doing interviews with local stakeholders. These hours all occurred May 4-26, 2016, over 21 days of fieldwork.

The City and County

This Southern/Midwestern central library is located downtown, and serves as headquarters for 40 other branches, and its building is over 500,000 square feet overall.

The city the library serves has 297,500 residents, with a 51% white population, 43% African-American population, and 3% Latinx population. The median household income is \$44,000, and nearly a third of all the city residents live in



Figure 21 Downtown in 2016, CC BY-NC-ND 4.0 Fastily

poverty (U.S. Census, 2015).

The city is home to major sports teams and many major corporations.

One of these is one of largest

multinational corporations on the

planet, and is responsible for a wide

array of health, food, and personal

consumer items. This is a major

employer in the region, with an

employee base of nearly 100,000 worldwide. A grocery company is also based in this city and

employs over 20,000 people locally. The city is home to a 4-year state university, and several

smaller universities and colleges. It is also home to a zoo and botanic garden, an opera house,

several theaters, and many festivals. It has a vibrant independent music scene.

The area was settled in the late 1700s largely by people of British and Scottish descent, and later Irish and German settlers. The city was long a bastion of the white working and middle class, with a large influx of African-Americans in the late 1800s. Racial tensions have a long history here. White riots were not uncommon in the 1800s, and riots in predominately black neighborhoods occurred in the 1960s. Racial uprisings occurred in 2001 due to the shooting of an unarmed African-American man wanted for traffic tickets. As with many larger cities, there are diverse neighborhoods in the city, each with its own culture and feel. The library is situated in a less-affluent area of the downtown, surrounded by parking garages, and lower-income businesses. Many people asked for money from passersby in front of the library (fieldnotes 5/4), and the businesses in this area appeared worn. A couple of blocks away is the cleaner, fresher, more tourist-friendly city center, with parks and fountains, attractive red-bricked historic buildings, and an assortment of glass-façaded skyscrapers. Also near the library is a gentrifying and “artsy” (Jenna) and “hipster” (Ray, Nick, Jenna) neighborhood where many library staff members go to eat lunch or get after-work drinks (Nick, Chuck, Liam, Jenna). Other



Figure 22 The library, CC BY-NC-ND 2.0 Elyse Feliz

neighborhoods are notable for restaurants, nightlife, or being filled with college students. Many neighborhoods are considered “poor” or struggling, often those with predominantly African-American residents (Rose, Gladys, Sabian, Jenna, Perry).

As in the other two cases, I had local informants willing to speak frankly about the local culture of the area. In this case, my sister and long-time family friends reside in Productive (Ray, Sharon, Amelia). They were able to fill me in on their perspectives of what the city was like. Ray in particular had insights; he was a long-time newspaper reporter and editor, now retired, who had significant experience with the politics and social issues of the community. Their sense was that it was a previously blue-collar working-class city that has enjoyed significant cultural revival. However, they said, it still struggled with a great deal of income inequality, crime, and segregation, as well as a significant drug problem. These contentions were borne out by the daily news I watched or read. Heroin addiction stories predominated the news, alongside sports reporting, and crime issues (e.g., Holthaus, 2016, May 17; O’Neill, 2016, May 18; Mirfendereski, 2016, May 26). The news sources I engaged with are rated as “least biased,” and highly factual in reporting, according to Media Bias/Fact Check (2022).

The Library

This library is run by a seven-person board of trustees. Four members are appointed by county commissioners, and three by the County Court of Common Pleas for seven-year terms. The board meets every other month. None of the trustees responded to repeated requests for interviews for this study, nor was a meeting scheduled for the time I was in the city, unfortunately, so I cannot report about the details of the board procedures, other than what was described in board minutes.

The main library is comprised of two buildings, which connect via a “bridge” or skywalk over one of the city streets. It is an institutional-looking pile of brick and concrete boxes with concrete pillars and long strips of windows. It was planned in 1955, replacing the 1894 library that was nearby. In 1982 a new brick expansion wrapped around the 1955 building, and in 1997

the north building and bridge/skywalk were opened. A walled garden sits outside the children's library area, and another abuts the south building near some program rooms. Wide steps and a brick wall buffer the main entrance of the library from the street, enclosing a green expanse of grass above it and a plaza-like expanse of sidewalk below it. When weather allows many people sit on the steps and wall, where there is some built-in seating, or along the street outside the library. I found it challenging to know where to go to enter the building, due to the screening greenery and wall. The first time I went to the library, I was so surprised by crowd shouting, scuffling, and soliciting change outside the entrance that I didn't notice a whimsical fountain that looks like giant books. The fountain nestles into the trees and shrubs in the green space by the doors. Having to run the gauntlet of the crowds at the entrance is a known problem at this library, and I immediately learned to enter at the north building entrance. I didn't notice the book fountain for most of the month I was at this library, I avoided the main entrance so assiduously.

Inside, a vaulted brick atrium and ramps leads to the various floors of the library, with a glass ceiling several stories above. A Friends of the Library store sits at one side of the atrium, and a help desk sits in the large, mostly empty space of the atrium. Top the right and rear of the atrium, circulation desks, popular materials, AV materials, and programming spaces taking up bulk of the space. On the second floor, a large room filled with computers comprises the Tech Center, and it is generally full by mid-morning. Signs to the "North Building" orient the user to take the bridge to the makerspace and young adult library. The bridge is a room that holds periodicals and is a quiet reading space. When one crosses through, one arrives at a glass-enclosed space on the left with giant words reading: "Makerspace*Create*Collaborate*Innovate" Past this wall to the center is a large circular staircase descending to the Children's Library and on the right is the TeenSpot, or young adult library. Elevators flank the teen library door.

The library has several floors, each of which is open in the center to the atrium and skylights. There are traditional library collections as well as specialist collections and librarians in intellectual property, genealogy, grantwriting, small business, and other specialized services.

Catalogers sit in underground windowless concrete rooms, while the administrators sit on the top floor among high windows. To make room for the makerspace, it removed substantial archives of newspapers and periodicals, which was for some people a controversial decision. No library patron mentioned this concern except for Ray, the person who hosted my stay in the city was a retired journalist, and deeply disappointed in the disappearance of these archives. The library staff reported a few complaints (Sophia, Jenna).

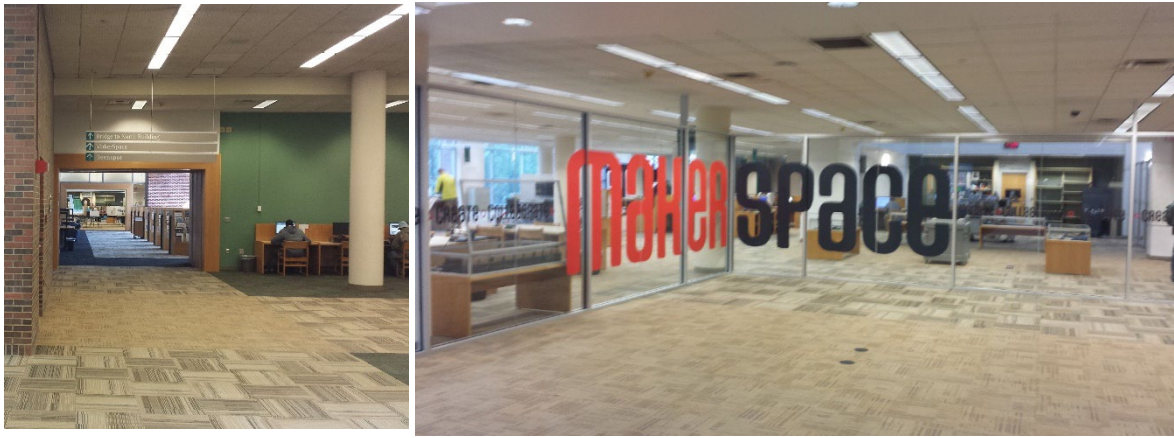


Figure 23: Left, The entrance to the "bridge" from the TechCenter; The MakerSpace glass wall

The décor of the library is simple, sturdy, and institutional. From the blocky melamine and oak tables to the striped carpet squares, everything seems chosen to be rugged, to hide grime, and to be inoffensive to anyone's taste. Occasional large plants dotted the library, but this was clearly a space that was meant for business rather than comfort, with the exception of the teen and children's libraries.

The library has 41 branches, 3 of which opened the year before my visit, in 2015. Each of the new library branches also has a makerspace. In 2013, the Productive Library received the IMLS National Medal for Museum and Library Service. Library Journal gave this library a 5-star rating for service by over the next few years, and in 2015, the journal ranked it as second among libraries with \$30 million+ expenditures. At the same time, it is suffering from the opioid epidemic and pervasive homelessness. In the first 5 months of 2016, the period in which I visited, there were more calls to the police for heroin overdoses than there had been in any of the

previous five years (O'Neill, 2016).

The Funding

The library reported overall revenues and expenditures in the Annual Report for this library, but no financial information on the makerspace specifically, or the main library, was made available to me, outside of Library Board minutes. Nor did even the staff running the makerspace know the “budget” under which they were operating, instead they were forced to request materials, supplies, equipment, or staff with no knowledge beforehand if these requests would or could be honored (Jenna, Chuck). Thus, I can only report generalities about the budget.

The state in which this library is located has a unique library funding structure, with the state funding all of its libraries from state tax funds, distributed according to population. This portion of the library’s income was nearly \$40 million dollars for all branches, or 68% of revenues for the year. A county taxing agency that answers to the library board partially funds his library system. Property taxes were over \$16 million, or 28% of the revenues. Fines and fees, gifts, and miscellaneous revenue sources totaled another 8.5% of the overall revenues. The excess revenues the library received, the library placed \$3 million in various funds, which totaled \$34 million at the end of the year. For expenditures, specifically makerspace expenditures, one can only extrapolate from the purchase lists that Jenna provided. No details on staffing costs, maintenance, or other fees were provided. The accounting procedures are complex, and line items are broken down in different ways in different areas of the report. Salaries and compensation are listed: \$27,500,000. Supplies are also listed, at \$1,640,000. “Other objects” comprise \$390,000. Which line items fund the creative place purchasing is unknown. Library board minutes mentions \$20,000 in funding from the Library Foundation, and \$11,000 from the Friends of the Library. \$275,000 was approved from the general fund in part to purchase the Espresso Book machine, and \$75,000 in general funds went to supplies in 2015, though this cost was offset by revenue (Library board minutes).

Table 10 All figures from the 2016 Annual Report.

<u>Revenues</u>	Rounded #	Percentages
Intergovernmental	40,000,000	67.8%
Property taxes	16,300,000	27.6%
Fines and fees	1,200,000	2.0%
Earnings on investments	130,000	0.2%
Contributions, gifts and donations	230,000	0.4%
Miscellaneous	<u>1,100,000</u>	1.9%
Total Revenues	59,000,000	

<u>Expenditures</u>		
Public service and programs	25,700,000	45.6%
Collection development and processing	12,600,000	22.3%
Facilities operations and maintenance	9,100,000	16.1%
Information services support	3,100,000	5.5%
Business administration	<u>5,800,000</u>	10.3%
Total Expenditures	56,400,000	

Upper administrators indicated that the initial equipment and supplies, and potentially the renovations to the building, were paid for through corporate and private donations, but they were less clear about whether ongoing expenditures were paid for in this manner: “All of the library’s programs are funded through a combination of gift funds and funds donated from the library’s... friends of the library. So that is not inside our operating budget. (Janet). However staffing and subsequent technology purchases are funded from the library’s general funds. Some equipment, such as the book binding machine, were so expensive that they were only purchasable through large gifts and donations. A substantial library foundation is overseen by a 26-member board, with the director serving ex-officio. This foundation manages donations, the library gift shop, and donations.

The Staff

Eleven staff members worked in the makerspace, some of whom also worked in the Technology Center. This was a complicated bureaucracy that the staff themselves did not fully understand. For example, both Jenna and Chuck believed they were in charge of the makerspace’s operations. Jenna was the main person that staff reported to within the space, but Chuck was the person who did scheduling, reviews, training, and hiring. Jenna reported to

Chuck. Staff in this space were mostly white men between the ages of 20 and 30. The exceptions included Aaron, who appeared to be in his mid30s, Martin in his 40s, and the four women who worked in the space. Jenna appeared to be about 30 years old, Ashley was 21, and Jordina, the only African-American worker in the makerspace, appeared to be in her mid-20s. Helen was in her late 50s or early 60s, and focused on assisting people with the sewing equipment. All of the staff I spoke with self-identified as creative in some manner, and interested in technology. Some were musicians (and in fact, some performed in bands, one of which plays nationally, and the other was entirely comprised of makerspace staffers and one person from another area of the library). Others were poets, comedians, or visual artists. Jenna was most interested in computer technologies and considered herself a maker, but not an artist.

These staff all self-trained on the equipment as they found time. There was front-end staff development before the space opened to public, but since that time, staff had to hope that there was a moment in which a machine was idle and they had no one vying for their attention, so they could learn how to use the tools. They taught each other when they could, but all the workers I spoke with wished they had some dedicated time to learn the equipment better. The only MLIS-certified librarian in the makerspace was Jenna. Colin also worked there full-time, but had not pursued an MLIS. Nick was a part-time employee, though often in the space, who was currently pursuing his MLIS. Chuck was full-time, but came from a corporate IT background, and I only saw him in the makerspace once, briefly. He said he tried “to keep everybody happy. That's why most of the time I work in the Tech Center so other people have the flexibility to work in the Makerspace.”

The Makerspace was considered a fun place to work, though at time staff welcomed the respite from constant, challenging, customer service requests when they worked in the Technology Center. The simplicity of helping people with email or social media felt like a break at times, after troubleshooting the laser etcher or design software for hours (Chuck, Aaron). The makerspace was a desirable place to work but required excellent customer service, so new hires had to “pay their dues” and demonstrate their service skills in the Technology Center for a few

months before Chuck would allow them to start working in the makerspace.

The Creative Place

Opened in January of 2015, the makerspace spreads across 9000 square feet, and is one of the largest library makerspaces in the nation (Jenna). 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 Welcoming Library, two to four library staff members always roam the makerspace. Eleven staff members are assigned to the makerspace at least part-time. 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. It is always partially in use, occasionally with only one or two people, but usually with a dozen or more. It is a near-silent space, with carpet muffling footfalls. As one enters the space, a few glass display cases orient the user somewhat. They are filled with objects made or used in the space, from a skateboard deck to a MakeyMakey microcontroller. However, these are unlabeled, except for generic signs such as “Maker Toys,” and one needs to know what the objects are for them to make sense. After these cases and some wall-mounted shelves with displayed books about making—though some shelves are empty—is the mysterious-appearing Espresso Book Machine. It looks like a copy machine mated with a glass-boxed elaborately-wired bomb. Its use is unclear, unless one reads the small list of book-making prices that sits atop it.

The walls in the space are largely comprised of windows. The remaining areas are painted pale or dark green and adorned with quotations encouraging making and innovating. Tables are widely spaced in most of the area, but there are long tables where people occasionally sit in the rear of the space, and a few “collaboration stations” which are small, rounded tables with a few

chairs, screens, computer connections, and electrical outlets. A button-making area sits toward the south of the space, with cutting and pressing devices and some price lists upon them. A multimedia conversion station and die cutting machine is on the south wall, next to the most popular piece of equipment: the vinyl cutter and printer which can make anything from stickers to iron-ons to banners. It sits in an alcove surrounded by windows, with stickers on the wall demonstrating which sorts of materials are available to users to purchase. It has a computer next to it for running the machine. On the opposite side of the small wall partially enclosing this area is the laser cutter/etcher and its computer.

Assorted trinkets and signs sit on the desk with the computer, showing users some of the things one could make here.

In the center of the room are several design-specific computer carrels, which are the only areas that offer privacy in the space, but are also the only place in which users sit near one another. It is the only space in which I saw collaboration or social making occur, outside of my own solicited collaborations. Next to that is a strip of copiers, computers, and a paystation, where staff members often are found assisting people with payment or reserving equipment.

A staff-only storage alcove is in the corner of the room, behind the wall partially surrounding the laser cutter. Staff offices are across the bridge, behind the TechCenter, but some storage areas abut the makerspace, as do a set of bathrooms (which I was told not to use, due to heroin use in it; the staff bathroom was near the TechCenter).

A long wall of windows, starting at the staff only alcove, holds several making stations:

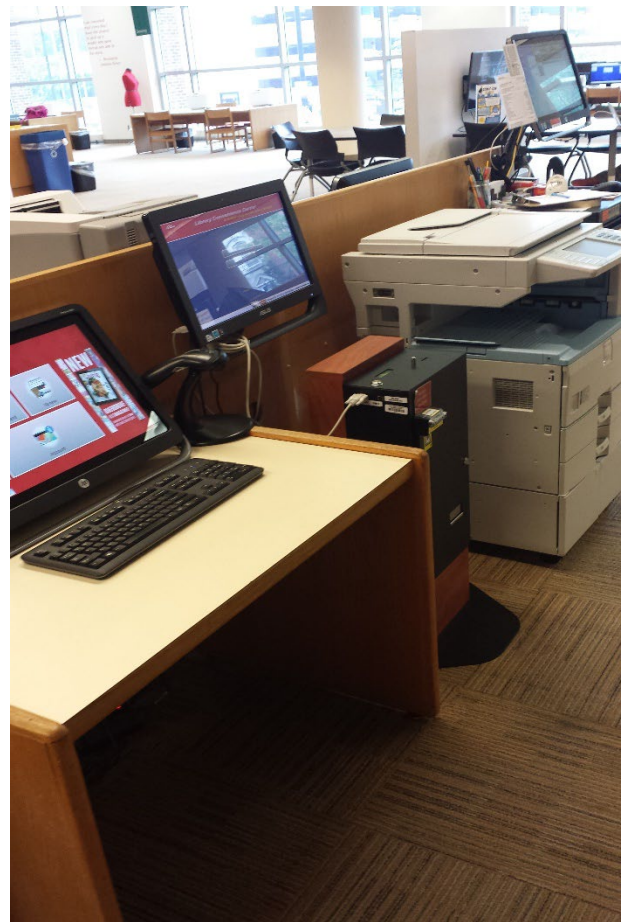


Figure 24 Copiers and Paystation

- The sewing station, including 2 machines and a dressmaker's dummy and a very large cutting table;
- The 3d printing area, with 2 widely-spaced tables, 4 printers and a 3D scanner, and computers to use them;
- A storage unit for supplies;
- A soundproof recording booth, that has the names of local bands listed on the door, including famous acts such as the Afghan Whigs, The National, and Mamie Smith, and more regional acts (one of which was the band a makerspace staff member was in). This recording booth was also the site of contention in the space, with theft, violence, and shouting occurring related to contested uses of the tool.

Toward the north end of the space where the bathrooms are located, is a large green screen and photography equipment. Near the bathrooms sits a large multicolored elephant sculpture, resembling a card catalog filled with drawers that encourage users to open them and engage with the sensory materials inside.

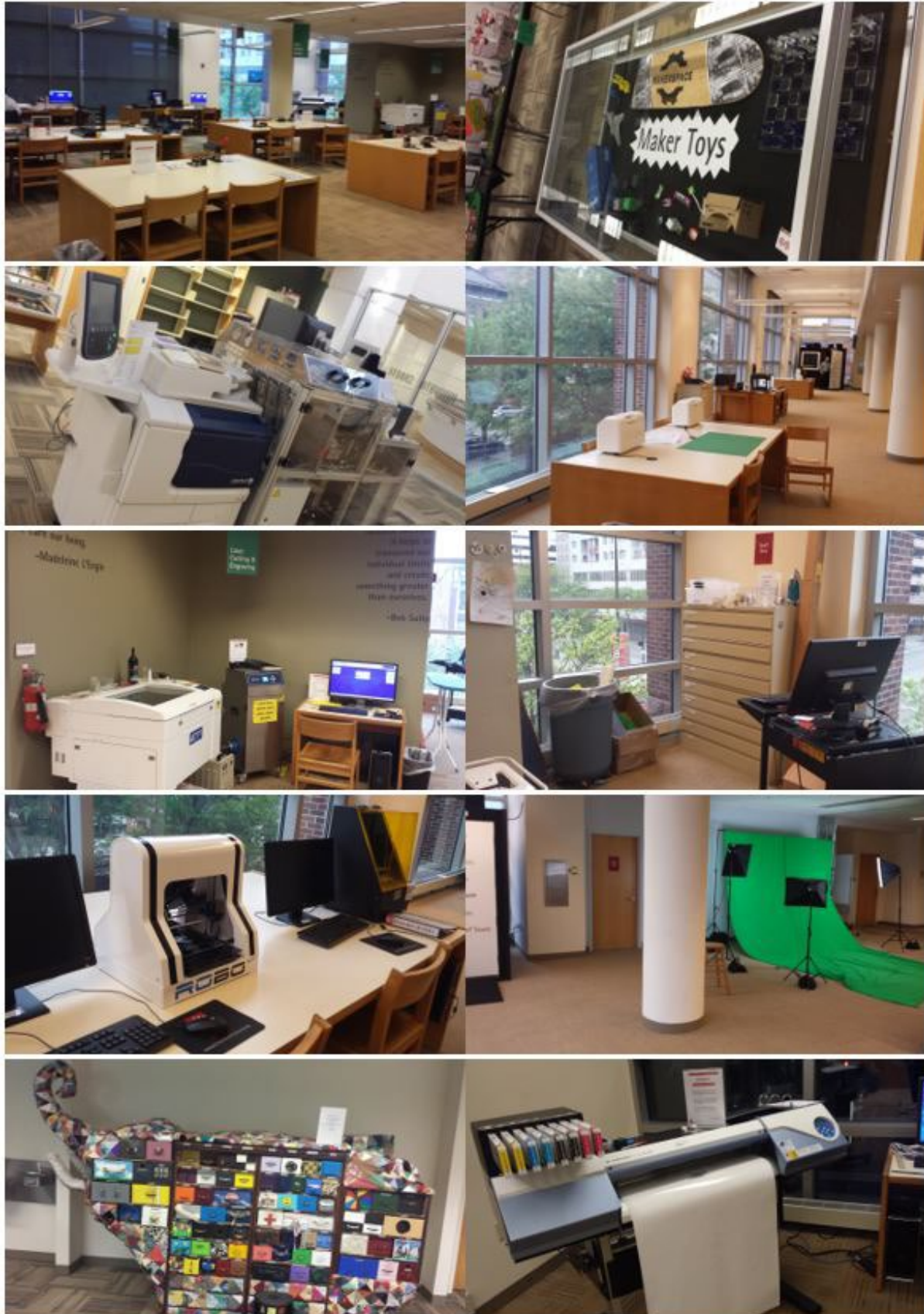


Figure 25: From top, left to right, button-making area, display cases, espresso book machine, sewing area view to 3d printers and recording booth, laser etcher, staff-only area, 3d printers, photography area, sensory elephant, vinyl cutter & printer

Tool List

- Full Spectrum Laser Cutter/Engraver P-series 24x18
- Roland Verscamm VS-300i 301n Wide Format Eco Solvent Printer Cutter
- All Purex Fume Extraction Systems
- Espresso Book Machine
- Audiorecording booth TASCAM DP-32SD, soundproofed, with professional mixing board, microphones
- Sewing equipment: 3 Brother Simply Creative Professional Computerized Sewing Machines, Singer Model 1116 Sewing Machine, Singer Pearlized Head Straight Pins, Singer SewPro Scissors, Mortelli Righthand Rotary Cutter - 45mm, Omnigrid Cutting Mat - 24x36", Panasonic U-Shape Steam/Dry Iron
- Electronics kits: Makey, Cubeits, Little Bits, MOSS Exofabulatronixx 5200, Arduinos, Raspberry Pi kits, breadboards and components
- Safety glasses
- Guillotine Paper Cutters, Xacto knives
- Photography equipment and Green screen: Canon Digital Camera Flash, Canon EF-S 60mm f/2.8 Macros USM Lens, Canon EOS Rebel T3i DSLR Camera (body only), Canon EOS Rebel T5i DSLR Camera, Canon IFC-500U USB Interface Cable - 15.4' (4.7m), Giottos Lens Cleaning Kit with Small Rocket Air Blower, lens filters, camera bags, black and grey backdrops, reflector disc, Lamps, diffusers, & stands, Green Screen
- EggBot (not in public use)
- Ellison Press Machine, dies
- Photo Box
- Silhouette Cameo
- 3M Laminating System LS1000
- Analog conversion equipment: Elgato Video Capture (Analog to PC), Epson Perfection V600 Scanner, Ion Tape to PC USB Cassette Deck, Toshiba DVD & VHS Recorder with 1080p Upconversion - DVR620, Wolverine SNaP - 14MP Digital Media Converter
- OstrichBot (not in public use)
- Watercolor Bot (not in public use)
- Soldering: Weller Benchtop Smoke Absorber (not in public use), Weller Electrically Controlled Digital Soldering Station WESD5-1 (not in public use), X-tronic 4 in 1 Hot Air Reworking & Soldering Station - 8000 Series (not in public use), Clamps, SE Helping Hand 2 1/2 Magnifier, Irwin Vise Grip 8" Wire Stripper/Crimper/Cutter
- Button press, Punch cutter
- 8 Desktop computers
- 2 MakerBot 5th Gen. Replicator w/ laptop
- 1 MakerBot Digitizer
- 1 Robo 3D R1 printer w/ laptop
- Rostock Max V2, with laptop
- Sense scanner
- 3Doodlers (not in public use)
- Mobile whiteboards
- Wired collaboration tables with monitors
- Software
 - Lynda
 - Photoshop + Lightroom
 - Gimp 2
 - www.thingiverse.com
 - www.tinkercad.com
 - 123D Design
 - www.scratch.mit.edu (Makey Makey)
 - Raspberry Pi
 - LittleBits (Arduino)
 - Dreamweaver

- Notepad+
- Adobe Creative Cloud 15
 - Photoshop + Lightroom
 - Illustrator
 - InDesign
 - Premiere Pro
 - After Effects
 - Audition
 - Dreamweaver
 - Creative Cloud
 - Muse
 - Fireworks CS6
 - Adobe Media Encoder
 - Extension Manager
 - Animate
- Microsoft Office 2013
 - Access
 - Excel
 - PowerPoint
 - Publisher
 - Word
- Premiere Pro
- Windows Movie Maker
- iMovie (on Mac)
- Meshmixer
- SketchUp
- Audacity
 - Autodesk Product Design Suite Ultimate 2016
 - 3ds Max
 - 123D Design
 - A360 Desktop
 - AutoCAD
 - AutoCAD Electrical
 - AutoCAD Mechanical
 - Autodesk 123D Make
 - Autodesk Inventor
 - Autodesk ReCap
 - Autodesk Robot Structural Analysis Professional
 - Autodesk Showcase
 - Autodesk Vault Basic
 - DWG TrueView
 - Maya
 - MotionBuilder
 - Mudbox
 - Navisworks Manage
 - Raster Design 2016 on AutoCAD 2016
 - Raster Design 2016 on AutoCAD Architecture 2016
 - Raster Design 2016 on AutoCAD MEP 2016
 - Revit
 - Netfabb Basic
 - Retinaengrave and other software for various equipment

Much of this equipment was kept stored away in the staff offices, staff only alcove or in closets. One had to know to ask to use the equipment; I never saw any of it offered freely to any users but me. Some of the equipment was brought out for special occasions, however, such as the EggBot.

The Participants

In this case, I recorded 12 in-depth interviews; held 12 longer interviews with notes and no recording; did an additional 28 brief interviews with notes; and observed 47 people in the space, explicitly and with consent. I more informally observed hundreds more use the space, but can only report their actions in general due to an opt-in model of consent for this study. Many participants in this space were reluctant to sign consent forms for the study. This included several

staff members. I offered forms to each person more than once if needed, but made it clear that I would not hound anyone to participate in the study. Thus I cannot report their discussions or interactions in the space, except very broadly. However, all the primary staff members in the space did participate. Below are all of the participants in this case, with the key informants in the findings chapter narratives highlighted in red.

Table 11 Productive Library Participants

Pseudonym	Role
Aaliyah	African American non-user, female about age 25, suffering homelessness
Aaron	older staffer approximately 35, worked at Xerox, in city transport previously, white male
Adam	guitar playing quiet staffer, approximately 25, white male
Alison	African-American homeschooling mother, mid 30s
Amanda	white woman, late 30s, Desiree's mother
Amelia	My sister, lived locally, Native American
Anna	white female, late 20s, user
Anthony	African-American older man about mid 50s, non-user of the makerspace, suffering from homelessness
April	white woman age mid 30s, using printer
Ariel	African-American non-user, early 20s or late teens
Ashley	very young new staffer, white female, age 21
Beth	white female mid 40s, with Melissa
Brent	white male, early 30s, laser cutter user
Caleb	computer services staffer, white man, about age 35
Candace	white woman, mid 30s, using button maker
Chuck	head of makerspace and tech central, white male, about early 50s
Colin	one who replaced her as the head after I left, full-time staffer, white approximately 30, male
Dana	white woman, late 40s, using printer
Desiree	white girl, about 12, button maker
Felicia	woman, early 20s, light brown skin and hair, button maker
Gladys	African American woman in her 40s-50s, writer, interested in publishing
Heather	white female school teacher, late 40s, user to print materials
Helen	staffer in her 50s-60s who assisted with sewing
Hunter	white male, mid 40s, with Tanya user, did soft circuits
Isaiah	African-American user, musician and graphic designer, early 20s
Janet	administrator in marketing, more directly involved, white female mid 40s
Jenna	Head of the makerspace, white, approx. 30 female
Jim	white male, late 20s, user laser cutter
Joe	bearded laid back staffer, approximately 25, white male
Jordan	African-American user, graphic designer, male, late 20s

Jordina	African American woman staffer, approximately 25, didn't interview with me
Karen	director of the library--never spoke to. White, mid-50s
Kent	white man, father of three kids who did felting with me, 3d printer
Kyle	staffer who did not sign a consent form, comedian, approximately 25, white male
Larry	staffer that largely runs tech center, white, under Chuck, never in Makerspace
Layla	mid 30s female, medium brown skin, black hair, makerspace user
Liam	young staffer, philosopher/artist/teacher, critic, approximately 25, white male
Lina	using printer, late 20s female, medium brown skin, dark hair
Luisa	Latino non-user, age mid 20s
Marla	female mid 20s, dark tan skin, dark hair, photographer, used printer
Martin	espresso expert staffer, approximately mid 40s, white male
Marvin	African American musician user, male, late 40s
Melissa	white female mid 40s, with Beth
Mia	African-American woman, poet, youth development, female mid 50s
Nick	MLIS student & staffer, cello player, white, approximately 30 years old, white male
Parker	white, mid to late 20s male, photographer user
Patrick	young staffer, rarely spoke to or saw, mostly in TC
Perry	African American man, musician, early 40s
Randall	staffer, expert in design, musician in local band, approximately 25, white male, interviewed casually but he never signed the consent form
Ray	non-user, white male late 60s
Rob	white, mid-20s user male
Roderick	white user, mid 40s male, printer, working on large banners
Rose	African-American older woman, anti litter campaign, mid-late 60s
Sabian	African-American jewelry and clothing designer, regular user, male around age 40
Sean	regular user, young white man with graphic design and makerspace background, about age 25
Sharon	friend, local, married to Ray, white, late 60s
Sheila	2nd in command administrator, white female mid 40s
Simon	poet in residence, white male, early 50s
Sophia	librarian in periodicals, approximately 25, white female
Tanya	white female late 30s, with Hunter, user, did soft circuits
Tina	non-makerspace staffer, white female around age 30, volunteers for makerspace events, did not sign a consent form
Victor	white late 20s male user, making car badges
Zach	young staffer, barely spoke to me, approximately 20, white male

My relationship to the staff was much less personal in this space. While the staff members were friendly and welcoming, they were less likely than the Welcoming Library staff to invite me to their homes or to spend time together outside the library. They did invite me to a small concert at a bar, featuring a band formed from 2 makerspace staffers and 2 other library workers. Jenna invited me to lunch. But several staff members, including Zach, Helen, and Kyle did not speak much to me at all. Two others neglected to sign consent forms, either deliberately or accidentally

(Randall and Jordina), and I was entirely unable to obtain access to the library director, trustees, or city officials. The upper administrator who did speak with me, Sheila, was distinctly unfriendly, uncommunicative, and cut our interview short by a third.

General Practices of the Creative Place

This space was an entirely at-will space with minimal programming. It was open at all times when the library was open. The library always staffed the space with at least two, and often four or five, staff-members. It was usually filled with 5-20 people, though in early mornings and later evenings there were often fewer or no users in the space. The staff observed a “deskless” model, which meant that they roamed the spaces as needed, making them challenging to identify and locate. However, they often congregated by the large cutting table or the pay-station.

There were few orienting signs or directions about the tools or space. The stations were labeled, but users were expected to ask staff about what the space was, how to use it, and so on. I saw several people enter the space, look around in a baffled way, and leave without interacting with anyone or anything. To orient users, often the staff give tours, formally or informally. In the month prior to my visit, the makerspace staff had given 18 class visits/tours to 532 attendees. During my visit, I observed one small tour of adults, and a few informal tours of 1-3 people.

Few children use the space, even though they are allowed to do so. I saw children during some homeschool gatherings, with their parents or caretakers a few times, and once I saw a pack of young teenagers use the photography station. Otherwise, I did not see children come into the space either on their own or with friends. Largely, the users of the space were adults. Many of the people using the design computers and the recording booth were Black. Most of the users of the other tools appeared white or of unknown racial or ethnic identities. Most of the users of the laser cutter, 3d printers, design computers, and recording booth read as “male.” Women largely used the space for the vinyl cutter, sewing, button-making, and occasionally photography. None of this was a complete bifurcation of gender, except one thing: I never saw a woman use the 3D printers, other than myself or a staff member.

The users had to pay for their materials at the paystation with credit cards or exact change, or go to the circulation desks to settle their bills, so staff members did not handle money. No forms were required to use any of the equipment in this space, though in another branch makerspace, forms were required. Most visible items created in the space were printed, cut, or etched on the paper printers, vinyl cutter, laser etcher, or button-making equipment. The work of the design computers and AV equipment was not visible to me, though I heard some of the music produced by two users and saw some of the flyers, plans, and other designs created. The 3D printers were rarely used, as was the Espresso Book Machine—which was often broken down or otherwise out of commission. The media conversion and die-cutting equipment was also rarely used. The sewing machine was used nearly every day, and usually by one patron: Sabian, a middle-aged African-American man who was a jewelry and clothing designer preparing for a show.

Responsive Library

I spent 131.5 hours in this library's creative place, or doing interviews with local stakeholders. Unlike the other two cases, these hours were spread out over the course of a few months. The lengthier span of study was due to my own scheduling availability and the necessity of spending more days in the space due to the makerspace being open few hours each day. I began spending time in the space on the day of its grand opening on July 23, 2016 through early October 2016, with a total of 31 days in the space.

The City

This upper Midwestern library is the main outlet in a small city an hour's drive from a major urban center. In some regards, this small city, as with Welcoming Library's community, is a commuter community orbiting a larger urban center. However, it is surrounded in a rural farming environment and multiple tiny towns, many of which have fewer than 2,000 people residing in them. At the same time, the city feels more suburban than either a city or a rural hub, with sprawling business districts, and wide-lawned residential areas. 90.5% of the city's

population of 43,000 is white, 2.5% is African-American, and 6.5% is Latinx. The median household income is \$46,500, and 13.5% of the residents live in poverty. The population that settled the city was largely German, and it was incorporated in 1847 (Wikipedia, 2022; Davis, 2002).

This city is sprawls over 20 miles. It is situated at the juncture of a few major interstate highways, and thus has several shopping and business center locations. The library has a “quick service” branch in one of these, in a grocery store near a residential area of the city. Some of the major industries in the area include a boat-engine building company, a large-scale cheesemaker, and a manufacturer of machine tools. The town has a few small college and university campuses, including a 2-year campus of the state university system (Wikipedia, 2022; Davis, 2002).

My home is forty-five minutes away from the community in which this space is located, and I have long-term knowledge of the community, though little direct experience. In my experience as a local librarian and library user, I know that this library draws users from towns within an hour’s drive of the city. I held a library card at this library in the early 2000s, though it had long-lapsed by the time I began this study (I hold library cards at libraries throughout the state). Residents of nearby rural towns sometimes may use this library as a resource center (Roger). Local informants and participants stated that the community was working class, but that it had a burgeoning art and technology “scene” as new attractive businesses such as coffee shops, breweries, and art galleries (Roger, Erika, Laney, Richard).

The early history of white settlement in the area centered on the fact that there was a large lake and rich farmland. The area was settled initially by a federal judge who had called for a military road to built so he could travel his circuit more easily. In 1836, he and 20 investors began selling the local lands. By 1848 over 500 white newcomers were settled on the former lands of the Chippewa nation. By 1855 the city had over 4000 residents and was nearly selected to be the capitol of the new state of Wisconsin, losing out to Madison by one vote (Wikipedia, 2022; Davis, 2002; Mentzer, 1991). The city was a transportation hub, with three railroads meeting nearby, and a short distance to Chicago. It was prosperous until the mid 1980s when a recession hit one

of the major industries in the city, a marine equipment company. Many large businesses still call this community home, including industries involved in steel, cheese, and transport tanker manufacture. The city is run by a manager and city council comprised of seven members who serve for two-year terms. It is served by a daily newspaper, eight bus routes, a children's museum, and one hospital. There are two two-year colleges in the community, as well as a private Catholic 4-year college.

The Library

This municipal library is run by a ten-person board of trustees. Seven of these are appointed by the local City Council from the community at large. Three are ex-officio members representing the City Council, public schools, and the county board, and are appointed by those governing bodies. Each trustee serves for a period of three years at a time, and can serve up to nine years. The board meets monthly. This library has one branch, located in a grocery store across town, and which specializes in quick pick-up of the most popular materials. The library's service population is a little over 70,000, including county residents(2016 annual report).

The main library, where the makerspace is located, is three stories high, with the lowest level being below grade. That basement level is comprised of the makerspace, program rooms, a staff room, the director's office and those of some staff members, and storage. The ground floor includes the children's library, new materials, teen materials, large print, periodicals and audiovisual materials. The main staff area is located behind a circulation desk, next to self-checkout machines. There are vending machines dispensing snacks and beverages. It also has an art gallery space located off the front entryway to the building. The upper floor houses adult fiction and non-fiction, reference materials and local history and employment materials. It is also where some staff offices are, as well as several glassed-in meeting rooms and a few dozen public access computers.

This library building was built in 1968, replacing an earlier building from 1902, when the library was granted \$30,000 by the Carnegie Foundation. Prior to its inception, in 1865, a Young

Men's Association had operated a reading room for its members. That library expanded so that by 1874 it held over 1200 books and was free for anyone to come. However, operations were challenging, and multiple organizations ran this free or low-cost reading library over the years, including the Sons of Temperance. This building was renovated in 2004 (Gores, n.d.).



Figure 26 Responsive Library

This library held a vast array of programs—nearly 500 in 215—and served over 18,000 with that programming. In 2016 (the makerspace opened in July) this increased to 640 programs and 18,500 served (2016 annual report).

The Funding

Like most libraries, this library derives its funding from multiple sources. They are funded through their local taxes, through cooperative agreements with other libraries, through donations, grants, fines, fees, and sales. They sell art in their art gallery, and books in their used book store. The overall budget in 2015 included a \$1.74 million municipal appropriation, \$800,000 from the county, \$15,000 from other libraries in the cooperative agreement, \$2,000 in federal funds, and \$242,000 in other income, such as through donations, foundations, or grants. The overall income for that year was \$2.8 million. Much of this went to employee wages and benefits, with \$350,000 going to library materials, and \$510 to other operating expenditures. The library was funded at about \$40 per capita.

The makerspace itself is funded through a combination of public and private funding, and cost \$233,000 to build and fill with equipment. This fund does not include the \$125,000 purchase of a property next to the library, where the used book store was relocated to make room for the space. Staff wages, ongoing materials and other costs are paid through the general, tax-supported

funds. However the funding for the initial development of the space came in part from a large IMLS-funded, state-distributed LSTA grant of \$12,195, funds from an endowment aimed at supporting teachers. An additional grant funded by the [W-state] Economic Development Corporation (WEDC) was promised, to the tune of \$25,000, matching funds provided by the local county economic development board. This money was spent according to the guidelines of the grant, but as of the end of my time in that library, the WEDC had refused to honor the grant and reimburse the promised and already-spent funds. One of the issues was of the types of materials the WEDC would pay for. They wished to pay for 3D printers, but those had already been purchased before the grant was approved. They did NOT wish to pay for the kitchen or materials in it, saying “There is also concern regarding how the baking/cooking supplies support the initiative and related to the makerspace. It would be good to either connect how those elements support the makerspace or identify other costs that are related to the equipment needs for the space” (from a personal communication of the WEDC Community Account Manager to the president of the local County Economic Development Corporation, June 12, 2015).

The struggles to acquire funding were well encapsulated in an exchange between Justin, the Information technology director and person administering the makerspace, and a Danish company supplying the space with software. The Danish business owner noted that in Denmark, libraries were funded ahead of military, and that he would have to offer the US library “non-governmental agency” pricing to address the shortfall in library funding in the US. Justin replied:

We generally don't get federal funding at all - it comes from the municipal/county level and varies greatly from place to place. I'm on a committee that basically lobbies for proper funding of libraries and these days it's often better to keep our mouths shut, for fear that the politicians will notice we're still here and find some new way to reduce our funding. I could go on and on about the way libraries are funded here and how little sense it makes, but it wouldn't really add anything to my point. (“Justin,” personal communication, September 13, 2013).

The Staff

Before the makerspace opened, the library was staffed with 9 MLIS-bearing librarians and

had an overall 32.25 full-time equivalencies for staffing. There were three main administrators operating under the library director, Richard: Justin, the head of IT, Madison, the head of the youth services department, and Jill, the assistant director. Other members of the administrative team included Leslie, the marketing and outreach coordinator, and several members of the reference staff, such as Sandy and Rebecca. The makerspace was staffed cooperatively between Justin, Leslie, Richard, and two new hires, Olivia and Shelby. The job description for the first 19.5-hour position that the library advertised for the creative place mentioned, as the first point: “Provides a welcoming presence” (“Position Description – Idea Studio Assistant”). The library hired a local assistant professor at a 2-year university for this position, Olivia. An additional hire of a 12-hour position followed shortly, this time with a “tech-savvy high school senior” (Justin, personal communication, June 15, 2016), Shelby.

Richard, a 40 or 50-something white man, was a former professional musician who had come to librarianship through his love of technology. He first worked in academic libraries, and made his way to a directorship on the basis of his technological savvy. Justin, a 30-something white man, had been an Americorps volunteer in this library after his undergraduate program. He developed technology for the library, and leveraged that work into a library-funded position. He swiftly obtained an MLIS degree to support his work at the library. He was an avid maker, active in several local making communities. He had participated, for example, in the researcher’s library makerspace, assisting with building equipment, attending maker events, and volunteering for a maker fair. He was also active in the local “young entrepreneurs” club, and helped to develop and present a series of unconferences centered on making, citizenship, technology, and whatever else the participants chose to present.

Olivia was a 30-something white female assistant professor of sociology, specializing in human sexuality. She was also engaged deeply in local making communities and the young entrepreneur’s club. In fact, I met Olivia at the first unconference held by this club, years before the library makerspace was anything more than a glimmer in Richard’s eye, in 2012. There I co-presented with Richard on public library makerspaces.

Jill was a 50-60 year old white woman who was the assistant director of the library. I rarely engaged with her, and never saw her or the children's librarian, Madison (30s, white woman) in the makerspace. All of the other staff I saw were white, and largely female.

The Creative Place

When entering the library, one must pass a wide atrium with a flight of stairs leading downward, past the children's library and circulation desk, to descend a staircase leading to the makerspace on the lower level. A green and white hexagon motif orients the patron to the proximity of the makerspace, as that theme is repeated throughout the space and library. At the bottom of the stairs, one is greeted by an unusual sign, proclaiming the makerspace, which is comprised of a series of a dozen or so hexagon-shaped shadow boxes filled with diverse materials of "making": LEGO, paper, grass, sailcloth, cardboard, etc. Other signs greet one at the door, detailing the times the space is open, what programs are upcoming, and stating that photographs are taken in the space and that anyone entering consents to their likeness being used by the library.

In between the stairs and the makerspace is an odd space, previously unused and empty, which started to act as an exhibition space. The "rolos" or collages made on rolodex cards, were

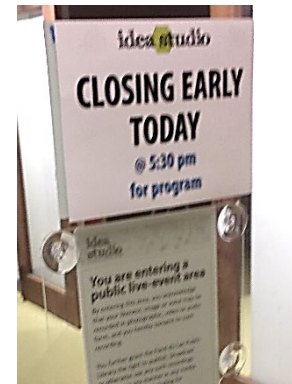


Figure 27 Signs at the entrance of the space

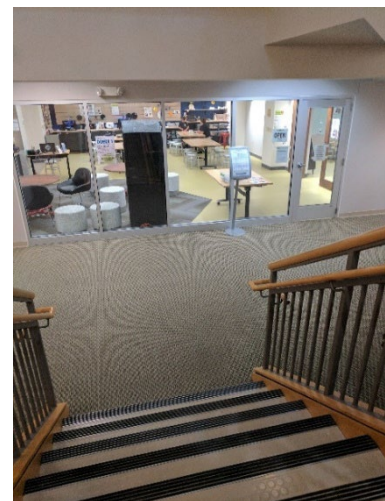


Figure 28 The stairs lead directly to the glass-walled makerspace.

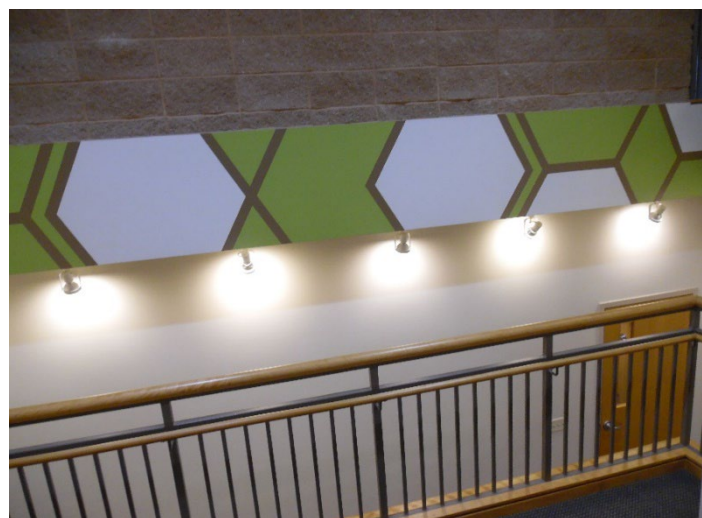


Figure 29 A regularly repeating motif orients the patron.

mounted here—dozens of them from all sorts of people. In 2017 the staff shifted this space to feature a collection of real refrigerator doors, donated by a local appliance company. These doors are used to display art and magnetic poetry created by the patrons.



Figure 31 Rolo art display

The makerspace comprises four rooms over 1931 square feet. The main space holds (usually) four making tables, a low table in the center of a casual seating arrangement, shelves and counters full of equipment, projects, and books. This section of the space holds the 3D printers, sewing equipment, Little Bits, paper cutting equipment, the Maker library of how-to books, many making kits and bins, and the main computer podium where staff generally stand when not assisting anyone.

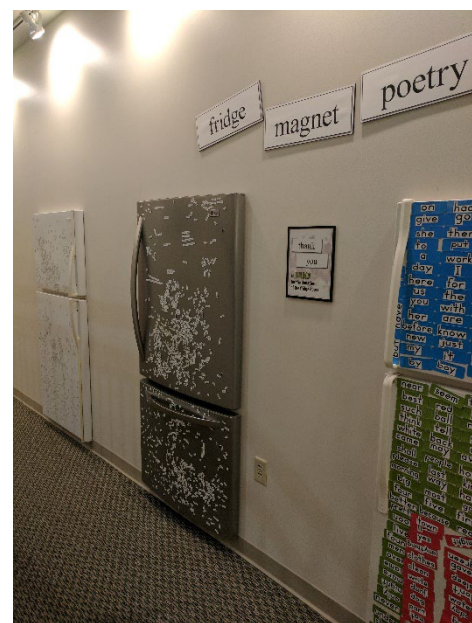


Figure 30 Fridge magnet poetry display

To the left, separated by a partial wall of hexagons, is the “test kitchen.” The library had intended for this to be a full kitchen, due to their active food-related clubs, such as the fermentation club. State health and safety regulations stymied this effort, prohibiting kitchens without very expensive washing stations, and no food may be served from this space. Instead it is used as a demonstration space. Ironically, presenters of food-related programs are welcome to serve food made in their personal kitchens in this space. A large closet off of this space holds all sorts of materials and tools, such as glue guns. A “war” of the glue guns occurred when children’s library staff and makerspace staff hotly contested the ownership of some glue guns. Such battles have resulted in all this equipment being clearly labeled with the makerspace logo.

Also to the left of the main makerspace area is a closed room housing a semi-professional and semi-sound proofed recording studio. This space is of particular interest to Richard, the former musician and library director. He holds programs demonstrating recording techniques once each week. This space is full of high quality microphones, a few instruments, and extensive recording equipment, along with an Apple computer loaded with programs such as GarageBand.

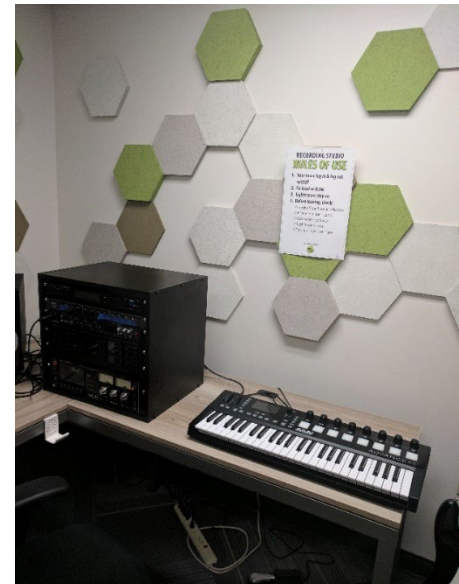


Figure 33 The recording studio

To the right of the main space, through large glass barn doors, is the more “industrial” part of the space. It houses the laser etcher and CNC mill, and starting in 2018, the printing press. This space also holds a set of large tables and is often the location for “badging” or other workshops. It also holds a large storage cabinet full of materials that may be purchased to use in the various machines, such as acrylic and plywood. The

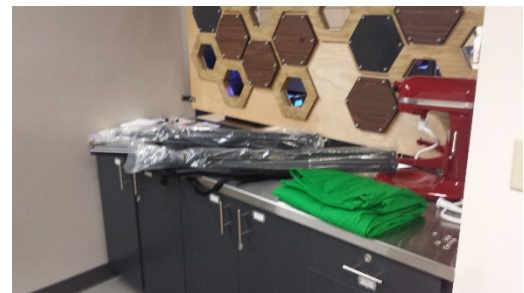


Figure 32 The partial wall holds the 3D scanning and photography equipment

furniture in the library itself is generic and institutional, but the décor of the makerspace is more eclectic, with metal stools, upholstered chairs, and a variety of tables, as well as colorful carpet and rubber flooring. As one enters the glass-walled space, one finds oneself in a large bright room, with electrical outlets dangling from retractable cords from a high ceiling. The ceiling is filled with silver ductwork. The walls are partially covered with slat walls, to hold an assortment of tools.



Figure 34 The test kitchen

This space opened formally in late July of 2016, though it had been the site of a “soft

opening” with multiple programs held in the space, for 2 months prior to that. On grand opening:

volunteers counted 269 verifiable attendees; however the overall library gate count for the day was up by over 700 from the previous Saturday, with no other major programs scheduled, so we suspect that our welcome table count was low. (Justin, July report)

In my months in the space, there were nearly always several people using it. The use did drop once school was in session, as many of the makers in the space were school-aged teens.

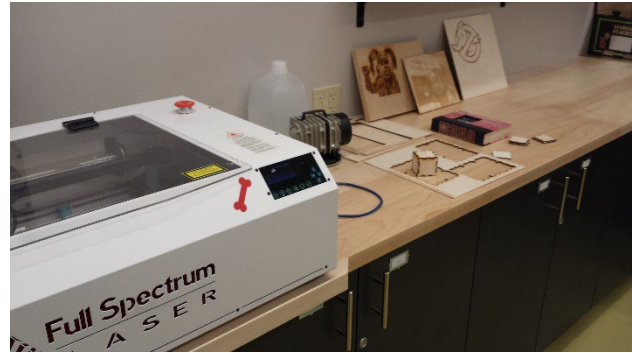


Figure 35 The laser etcher



Figure 36 Tools in the makerspace

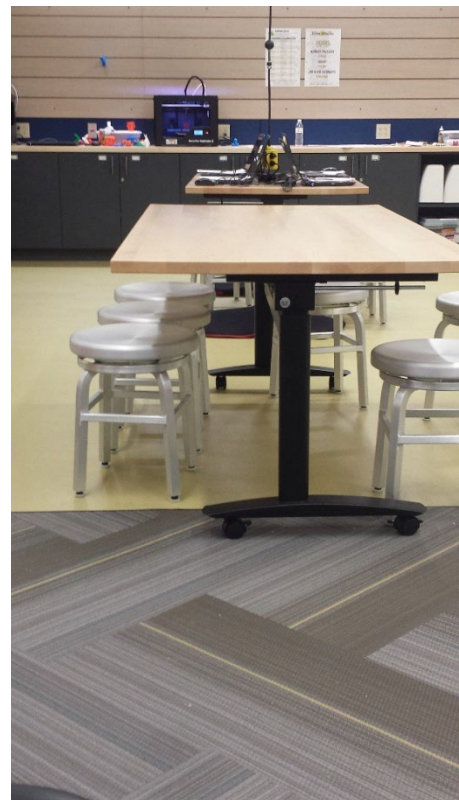


Figure 37 The main room of the makerspace

Tool Lists

Audio and Music Creation tools

- Garage band software
- Apple computer
- Recording equipment
- Ukuleles
- Audio Recording Equipment & Editing
- Oral recording / editing software
- Hindenburg Journalist
- Video production equipment
- Video and still cameras
- video editing software
- green screen
- Lytro camera
- Zoom audio recorder
- Slide carousel projector
- Portable digital projector

Technology, IT, and Computers

- Kano Raspberry Pi coding Kits
- Raspberry Pi computers
- Little Bits
- Snap Circuits
- Photo editing software, Photoshop
- Laptop computers (PCs)
- 2 MakerBot Replicators
- 1 MakerBot 3D scanner
- MakeyMakey microcontroller
- Arduino microprocessors
- Kill a Watt energy meter

Culinary

- Stove/oven
- Fridge and Utility sink

Craft/Make

- Sewing machine
- Serger
- Paper cutter
- Cricket (die cutting machine)(\$200)
- comb binding machine
- Laser cutter & filtration system
- Laminator
- Button maker
- Screen printer
- Hot glue guns
- Fire extinguisher
- Carvey CNC machine
- Shop vac
- Legos
- Safety equipment
- goggles
- Hand tools
- X-acto knives
- Big screen TV
- Smaller TVs
- Bicycle Repair tools
- Circuit pens
- Bare conductive paint
- Creopop - 3D ink Pen
- Kits including jewelry making, collage, embroidery felting, circuitry materials, etc.

Proposed programs

Before the creative place opened, this was a list of programs the library expected to host:

- Visual Arts
- Collage
- Printmaking classes
- Paper making class
- Pottery
- Jewelry making
- Metal stamped Jewelry
- Photography (Darkroom)
- Digital Photography
- Woodworking[Text Wrapping]

- Break]
- Performing Arts
- Moth style story slams
- ukulele group
- Theater in unexpected spaces
- How-To
- Sewing
- Gardening / Potting
- DIY Upcycled Projects: i.e. building couches out of pallets, lightswitch covers out of barn boards, lamps out of ball jars, etc.
- Zine making class
- Basic auto or small engine repair
- Basic home repair: simple electrical & plumbing
- Bicycle Repair
- Field Dressing
- Scrapbooking
- Fly Tying
- T-Shirt Screen printing[Text Wrapping Break]
- Business
- Entrepreneurship
- Professional networking tool such as LinkedIn.
- Topics relating to marketing using tools like Instagram, Facebook, Pinterest, Tumblr
- Business databases
- Technology
- Operation of the Google Family of tools in the cloud could also be attractive to the community.
- Basic Electrical / circuitry class
- Graphics editing tools and teaching would be helpful.
- Basic video editing class culminating with FDL 5 minute film festival
- How to record audio / field recording
- Circuit bending
- Mobile Apps
- E-Textiles
- Printed circuit boards

The Participants

In this case, I recorded 16 in-depth interviews; held 3 longer interviews with notes and no recording; did an additional 8 brief interviews with notes; and observed 20 people in the space, explicitly and with consent. I more informally observed a dozen more use the space. Below are all of the participants in this case, with the key informants in the finding chapter narratives highlighted in red.

Table 12 Responsive Library Participants

Pseudonym	Role
Aidan	white, early 20s or late teens, engineer student, user
Alan	city council member, husband of Erika, white, late 40s
Cameron	musician-rapper teen, medium brown skin, black hair, didn't interview
Chloe	White teen girl user of the space
Claire	Ten year old girl, Asian American, uses space during programs or with her mother
Dylan	young occasional user, son of maker Roger, homeschooler, white, age 12
Erika	trustee, artist, advisory council member, white, late 40s
Fred	minister, white, mid-late 40s, user of space

Gabrielle	volunteer, mid 40s, white
George	Tyler's father, late 30s white
Jack	regular young user, homeschooler, 13, white
Jill	library administrator, white, 50s
Justin	head of space, white, late 30s
Laney	trustee, school principal, white, 40s
Leslie	marketing & Outreach coordinator for library, white, 50s
Logan	white, late teens musician non user
Madison	children's librarian, 30s, white
Mason	regular young user, white, seems too young to be 13, didn't interview
Meredith	Asian-American user of space, woman about 40, mother of Claire, didn't interview
Noah	white young user of space, age 13
Norah	adult woman user of the space, Tyler's mom, white, 30s or 40s
Olivia	major staffer in space. Prof of sociology, late 30s, white
Paloma	wife of Justin, artist, late 30s, white
Randolph	older white man, perhaps mid 60s, photographer
Rebecca	reference librarian, white, 50s or early 60s
Richard	Director, white, late 40s to early 50s
Rina	Jack's sister, user with mother and brother, 10-11, white
Roger	maker, started makerspace in other city, on Idea Council Advisory Board, white, early 50s
Samantha	white mother of Jack, late 30s
Sandy	Librarian, white, 50s
Shelby	page-level staffer, did not participate, white early 20s
Sylvie	mid to late 40s white female, user of serger
Tessa	late 20s white female, user of space, art
Tyler	regular young user, with his father and occasionally mother, white, 10-11
Wyatt	maker, on Idea Council Advisory Board, white, late 40s
Xavier	African American teen musician non-user, 18

I have been an observer of the planning and decision-making processes in the advisory board meetings that helped to develop this space since 2013. In addition, I interviewed the director of this library, Richard, for an earlier project about his thoughts and plans for a makerspace. I know Richard, though not well, simply because I was a librarian in nearby communities for many years and I met him at state library conferences and local events. I co-presented an informal discussion on library makerspaces with him at a conference in the Responsive Library's city in 2014.

In addition, I know the person in charge of the creative place, Justin. I met him when I attended a local "Maker" group, where we were both members, and he assisted me with my own

library makerspace development in 2011. I have also taken a class in public librarianship with him, and have occasionally socialized with him and his family in group settings. In addition, I have met the library board president, Erika, several times, and have taken an art class with her. I have met the daily manager of the makerspace Olivia during the conference event held in the city, and she has invited me to speak at her university about makerspaces in the past. While I am not a close friend with any these participants, they are friendly acquaintances. While these relationships are different than those I developed at the other two case study sites, I became friendly to people in each case, and socialized with them. Such friendships have helped me to obtain entry into the sites, have assured the participants that it is safe to speak freely with me, and expedited my assimilation into the culture of each site.

General Practices of the Space

Responsive Library is similar to Productive Library in that the creative place is always staffed. Two staff members are usually present in the space. When their help is not needed they work on preparing for future programs or other library work. When several users need the help of the staff members at once, they prioritize needs generally according to a first-come, first-served principle, just as the staffers at Productive Library do. However, unlike the other two spaces, this area is only open for five hours on weekday evenings, and for seven hours on Saturdays—much less than the overall library hours of operation. Users are trained on many of the tools through training sessions at set times, and must pre-register to attend; available slots fill up swiftly for these sessions. These classes are thorough and include some hands-on aspects, whether it is manipulating a virtual object in the CNC mill interface on laptops, or it is threading and sewing on the serger. Staff use these training sessions to ensure that users understand safe and effective use of the equipment, so they do not damage themselves, their materials, or the tools. These sessions are training, helping, informing, and authorization processes all in one. When a user has completed a training session, they and the staff member sign the policy regarding that piece of equipment, and they are then authorized to use the tool, at least within the guidelines the library

establishes. Thus users were “badged” on tools one by one, though there was equipment available that did not require “badging,” such as the Little Bits.

Aside from the regular badging programs, many other programs are held in this space. During my time there, programs included two day-long events with multiple types of making supported, fiber arts programs, crafting programs, and ongoing drop-in art programs.

Appendix B: Institutional Power in Public Libraries

The research questions this study asks pivot upon two main variables: the users and the institutions. To understand the empirical literature about makerspaces and power in public libraries, one must first understand, in broad terms, how libraries are administered. This administration demonstrates how the power to make decisions is enacted by the institutional actors. The complete ecology of public libraries—their development, funding, governance, and policies, as well as the types of programs and spaces they provide—is not thoroughly explored here. Such an endeavor would necessitate many chapters of intensive literature review. Nevertheless, each of these are aspects of power enacted by various stakeholders in the institution of the public library. This appendix will offer a brief overview of how libraries enact power through policy and resources, with the exception of those enactments of spatial arrangements and programming that I discussed in Chapter 3. The focus here reflects the findings of this study, and the areas of public library power enactments that had the most impact on the stakeholders in the makerspaces.

Public libraries as a tax-supported public institution began in the 1850s with the founding of libraries such as the Boston Public Library. Libraries swiftly became a cultural force in the United States. By 1876, Melvil Dewey began the organization of the American Library Association and conventions, library journals began publishing papers, and the U.S. Department of Education began collecting library statistics (Ditzion, 1947; Garrison, 1979). As public libraries spread to over 16,000 locations throughout the country (ALA, 2016), the ways in which municipalities, counties, and tax-levying districts structured and administered them developed along broadly similar lines throughout the country.

Federal laws providing funding for public libraries began with the Library Services Act (LSA) of 1956, which funneled federal funds directly to rural public libraries. The Library Services and Construction Act (LSCA) shifted the focus on funding services to include funding buildings in the mid-1960s to 1990s (Fuller, 1994; Gregory, 2001). These acts placed public libraries under the purview of the Department of Education, and libraries were largely seen as

educational institutions (Molz & Dain, 1999). In the earliest era of public libraries, often-female activists likened to missionaries often founded them; libraries were civic cathedrals and monuments to a public spirit and consciousness (Augst & Wiegand, 2001; Goldstein, 2003; Mattson, 2000; McCrossen, 2006; Nardini, 2001; Ring, 2001). The Museum and Library Services Act passed in 1996, and it shifted federal library spending priorities and criterion from buildings and services to technology support (Molz & Dain, 1999). This act specifically enjoined the IMLS “to promote literacy, education, and lifelong learning and to enhance and expand the services and resources provided by libraries, including those services and resources relating to workforce development, 21st century skills, and digital literacy skills” (Museum and Library Services Act, §9121(5)). To accomplish this and its other mandates, the IMLS provides some funding to state library agencies, requires reporting from them, offers a variety of grants and educational opportunities, and works with governmental agencies and private partners, such as the MacArthur Foundation (IMLS, n.d.-a; Manjarrez et al., 2007), and corporate/foundation partners (Becker et al., 2009). Library Services and Technology Act (LSTA) grants offered by the IMLS are shared between the states, which then distribute them to libraries and library systems (Bertot et al., 2006b; Gregory, 2001). LSTA grants are intended to provide better technology support for communities, and the states may distribute them as they choose, as long as the criteria reflect IMLS funding priorities.

Resources as Power Enactments

Resources are media through which power is exercised, says Giddens (1984, p. 16). The library’s resources are generally marshalled and distributed on a local level, in ways that express local power, while also being constrained by state and federal guidelines. Local tax levies primarily fund most public libraries: municipal taxes on homeowners, school district taxes, or other forms of taxes. Some libraries have the power to levy taxes on their own. However, most are dependent upon city governments to select their funding levels—and that funding can be tenuous and hard-won (Harissis, 2017; OCLC & Association, 2018; Spears, 2016). City officials

allocate municipal funds for the library's board of trustees and/or library director to distribute. Some state and federal funding may augment this primary source of income, often through grants provided via state libraries, and from the IMLS. Donations and grants to public libraries round out the major portions of most libraries budgets. These are often from private individuals or corporations, and may have specific strings attached to how the funds are spent.

Regardless of funding structure, public library budgets have generally deteriorated for several years, from a level that was not robust initially (Carpenter, 2020; Davis, 2006; Harissis, 2017; Lyons, 2013). Public libraries are increasingly seeking outside funding sources to sustain basic services, or to offer new services such as makerspaces (Ashman, 2002). Some libraries may levy their own taxes (Trezza, 1989). Others may charge fees for services that were previously free for all (Alexander, 2013). Such changes in funding involve public policy decisions to reapportion the responsibility for library services to increasingly private domains, through grants and donations. Libraries are struggling to make do with the resources they have, and calls for new programs or services, such as makerspaces, are sometimes seen as a burden on the already-overburdened (e.g. Kim & Copeland, 2020).

Libraries are administered through local control shared between a professional—a library director or manager, whom state law requires to have particular certifications and education—and the library's board of trustees, who are generally selected by a municipality's governing officer or mayor. Governing agents such as mayors commonly select trustees from community members, local organizations, and the city council or other governing body. In some cases, the library staff suggests potential trustees. Ideally, the trustees represent a broad range of constituencies in the community (e.g. Wiegand, 2011, p. 126), doing their civic duty in a democratic system of true representation (Bergan, 1958; Christenson, 1995; Norman & Ihrig, 1979). In practice, trustees are often a socioeconomically or politically privileged elite (Dain, 1991; Gibbs et al., 2007; Harris, 1975; Joeckel, 1935; Koepp, 1969; Lynch, 1998; Marshall, 1984; Prentice, 1973; Warner, 1999). They are often local business owners, sometimes assumed to offer librarians entrepreneurial advice, or reflect neoliberal perspectives (Holt, 2005; Irwin, 2012;

Koepp, 1969).

The legal requirements for public libraries are tied to the mechanisms by which they are funded, with governance issues outlined by funders and the state. Each state varies in how the power between the director and the board is shared. Generally, the board has control over how budgets are allocated, and to create and modify library policy. The director then has managerial control over expenditures, human resources, and the procedures by which the library is run in practice.

Since public libraries are largely funded at the state and local level, state and local policy spells out much of the governance rules. State law delineates how libraries may be instituted, what sorts of libraries may legally exist, the library board structures and powers, the education needed to administer the library, and the basic policy of library service. States mandate many public library practices, including filtering the internet, regulating privacy controls, and creating or merging library systems ("Chapter 43: Libraries," 2011; Ren, 2013; Ward, 2004). Local bylaws further detail library trustee requirements and other governance issues, and local funding control can frame how decisions are made.

Library boards of trustees, municipalities, and library systems institute policy relevant to public libraries at the local level. In different states, library boards of trustees have different powers assigned by law. They may hold the power to buy materials, hire all staff, and make all rules and policy, or their powers may be more limited ("Chapter 43: Libraries," §43.58; "Chapter 54. Libraries and reading rooms," 2013; Holt, 2005). Statutes limit some boards to advisory status alone, with city managers taking a more administrative role (Weingand, 2001, p. 19). A mayor or other municipal executive generally appoints community members as trustees, often alongside a school board member and/or municipal representative. The trustees may not have any experience or training in librarianship, may not use the library, and may have particular agendas in mind as they serve (Arns, 2007; Norman & Ihrig, 1979).

The Norms of Policies and Procedures

Policies, procedures, and professional identity all reflect the norms of the public library. Issues of quiet, of asking for assistance, and of waiting one's turn are all examples of norms that express power. Library policies are the most explicit of these power expressions. Policies are ideally developed to balance the immediate needs of users with a community's long-term needs (Jaeger, Gorham, Bertot, et al., 2014). They should be "compatible with both the profession's institutional norms and values and the local community's norms and values" (Ward, 2003, p. 6). Many libraries also create procedures manuals (sometimes called staff or operations manuals), deriving workflow procedures from the practical implications of their policy (Fitsimmons, 2011, 2012a, 2012b; Germano & Fitsimmons, 2012; Hoffman, 1985; Pearlmuter & Nelson, 2012). Scholars consider such manuals as "indispensable for good library management...[or] synonymous with autocratic administration...[depending on whether] it's a tool of despotic leadership or a stimulus to participative management" (Hoffman, 1985, p. 342). Policy and procedure decisions are supposed to drive the day to day operations of the library, visible in each patron-institution interaction.

At the level of each individual library the most basic policy decision is determining the mission of the library (Balas, 2007; De Guerra, 2008; Garcia & Nelson, 2009; "A mission statement," 1977). Missions drive further policy choices, including collection development, internet use, programming, and meeting room policies. Policy decisions made at the library level interact with each larger level of policy. A library board's funding policy may bump up against state and federal policies, library system rules, as well as against private corporate policies regarding access and infrastructure. Below these policy stratum are further layers of bureaucratic control, from the library administration to the front-line staff, each of which may make rule-based decisions, sometimes inconsistently (Holt & Holt, 2005; McKechnie et al., 2006; Turner, 1993; Weingand, 2001). While policies must be legal, reasonable, nondiscriminatory and, ideally, quantifiable, or they can be challenged, they may be applied contradictorily and/or may not be fully grounded in an understanding of the law (Larson & Totten, 2008, p. 10).

While collection development and classification practices are not the focus of this research, the “power to name” (Olson, 2001) is one example of how libraries and librarians express power. Several scholars have explored issues of power in relation to the library practices of classifying and cataloging materials, developing classification schemes, and the processes by which these schemes are amended over time to reflect shifting cultural values. The preeminent scholar in this area, Hope Olson (2001), explored how seemingly neutral practices of naming a document’s subject reveals and constructs social mechanisms of control over the collections and use in libraries. The seeming transparency, non-bias, and consistent application of controlled vocabularies, hierarchies, and classification schemes masks the librarian’s power. Some of the subject headings reflect power structures that exclude people of color and women, for example.

According to Olson (2001), some practices of unwavering simplicity in classification practice restricts the ability for not only the public to amend the catalog, but even at times the individual librarian is constrained. While the consideration of local needs are part of the mandate of classification systems, the control evoked through the other mechanisms tends to be exclusionary, involving legitimated structures of authority. Olson notes that, “Techniques to make our systems permeable seem risky to us as library and information professionals long steeped, like a jar of sun tea on the front porch, in the tradition of the presumption of universality in naming” (p. 659), she and those who answered her call for ethical classification practices call for just such permeability. Scholars such as Drabinski (2008, 2013) and Colbert (2017) describe practices of user-driven cataloging that both respond to the power-inequalities in the classification schemes broadly, and to ensure that users share in the power to shape and use the classification system to meet their own needs.

The ability to acquire and dispose of materials is another type of power. While library policy often delineates these powers in detail, often the policies are far more measured than the actual practice (Kelly, 2015). Sometimes community members feel particularly victimized by such expressions of library power, as when they protest against materials acquisitions and deaccessions (for example, Baker, 2002; Dilevko & Gottlieb, 2003; Jatkevicius, 2003; Robbins,

1996; Sherman, 2017; Zimmer & McCleer, 2014). In response, librarians call upon their interpretive schemes surrounding their professional identities as protectors of intellectual freedom to defend their privileges and responsibilities to make such decisions on behalf of the public they serve.

Public library policy is not always consistent, or informed by librarians, or even by democratic values (e.g. Pawley, 2007, p. 281). Policy also may not directly inform practice. For example, individual staff practice may or may not adhere to policy or procedures manuals, and procedures manuals may either not exist, or may not be linked to policy (Fitsimmons, 2011; Fritts, 2009; Larson & Totten, 2008). Libraries as institutions may seek different policy solutions for problems than individuals working within libraries. Yet a lack of research on the impacts of public library policy is a stumbling block in understanding how policy and practice are linked, or how they affect service (Jaeger, Bertot, et al., 2013), though this is shifting in recent years, as we will see in this literature review (e.g. Pun, 2021; Skåland et al., 2020; Teasdale, 2020)

The Interpretive Schemes of the Library Faith and Professional Identities

Often unwritten assumptions or practices, reflecting both cultural and professional values (Dick, 1999; Jaeger, Gorham, et al., 2013; de la Peña McCook & Barber, 2002; McCrossen, 2006; Robinson, 1994), comprise the interpretive schemes of library workers, and shape the norms I discussed above. Sometimes these values explicitly invoke ethical frameworks, such as Rawls's theory of distributive justice (Johnson, 1994), or Sen's capability approach to social justice (Irwin, 2012). For example, collection development procedures are one of the sets of norms that creates the facilities available to public library users. These norms libraries rest on the types of interpretive schemes leveraged by institutional actors, which involve:

... the modes of typification incorporated within actors' stocks of knowledge...which actors draw upon in the production and reproduction of interaction...whereby they are able to make accounts, offer reasons, etc. (Giddens, 1984, p. 29)

In the field of public libraries, the interpretive schemes are best known as the *imaginaire* called the *library faith* and are enacted through the adoption of public library professional identities. Tensions exist between certain strains of public library professionalism and the needs of the people to have their needs met in a library, and the legitimization of library professionals plays a significant role in this research, as the findings chapters reveal.

Issues of gender, education, middle class ideals, and the role of the professional in public library makerspaces has been little studied. These issues have been examined in the larger library literature, however. Michael Harris (1986) defines the profession of librarianship's basic interpretive scheme as based on the Book, with the "conviction that librarians are able, based on their special knowledge, to distinguish the enduring from the ephemeral, the valuable from the worthless, the good from the bad; and that the librarian has the right to prescribe for readers via the process of selection" (p. 234).

Throughout public library history, "libraries and librarians worked toward the establishment of standardized, routine, and common modes of practice...to some extent divorced from the needs of the individual community in which the library was located and were aimed at promoting the professionalization of librarians and libraries" (Carroll & Reynolds, 2014, p. 582). The shifting identities of librarians as professionals has changed over time to reflect diverse understandings of legitimate power relationships within libraries (e.g. Black, 2003; Fichter, 2006; Friedman & Morrone, 2008; Gray, 2013). In the early part of the 20th century, Bushman and Carbone (1991) argue that professionalization "suggest[s] a general tendency toward centralization and increased bureaucratic control" (p. 30), and that it accompanied similar changes in other educational institutions. Others see similar tendencies in the professionalization of librarianship during this era (e.g. Dilevko, 2009; Gray, 2013). This shift to a managerial discourse in librarianship accompanied Cold War era rejections of Communism and attendant control over what libraries distributed. The federal funding of rural libraries occurred in response to the poor conditions and unprofessionalism in some of these libraries (Pawley, 2010), with a need to inculcate American values through the institution.

Neoliberal understandings of what libraries should look like and librarians act like arose in the 1980s (Buschman, 2003; Irwin, 2012; McMenemy, 2009; Stevenson, 2011). Neoliberalism involves, according to theorist David Harvey (2005) is:

a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade. The role of the state is to create and preserve an institutional framework appropriate to such practices... (p. 2)

Under this theory and in this historical moment, the public good of the public library was perceived as best applied in ways that supported individual learning and skill-building, generally for economic reasons that benefit the market and the individual (Greene, 2021; Greene & McMenemy, 2012; Huzar, 2014; McMenemy, 2009). In one example, extrapolating from neoliberal tenets, Maura Seale (2013) describes how information literacy schemes can reproduce neoliberal notions and oppress people who are socioeconomically disadvantaged. These schemes, she argues, can blame the victims of structurally-reinforced economic disparities, rather than address social choices such as moving jobs overseas or replacing workers with automation: “because individuals can choose to become information literate and because information literacy can resolve social and economic inequities, those inequities are ultimately the fault of those individuals” (Seale, 2013, p. 48). However, public libraries can also act as points of resistance to neoliberalism, by offering free materials, safe spaces, and expressions of social solidarity (Aptekar, 2019).

Many variants of the library faith exist within librarianship today, from neoliberal narratives of individualistic “pick yourself up by your own bootstraps,” to collective visions of civic communitarianism. Access mandates and intellectual freedom practices remain central to the library faith, even as they are troubled with issues of diversity and inclusivity (Oltmann, 2019; Oltmann et al., 2022). But social work and trauma-informed librarianship practices jockey with policies prohibiting body odor (Berman, 2007; Giesler, 2021; Lazakis, 2020; Lloyd, 2020; Sharkey et al., 2021), for example.

Illich (1973) critiqued professions and professionalism, believing that professions have often served their own institutional values through creating “needs” and then fulfilling them, through authorizing correct behavior and conditioning desires until the users of professional institutions no longer have a clear sense of what they can do or actually want. While few LIS scholars go so far as to suggest that public librarianship has created a culture of radical monopoly and overprogramming, some are making such cases, especially in regards to the idea of information literacy. Some strains of professional identity and practice are responding to such ideas with more user-centered and participatory practices (Bowler et al., 2011; Cuong Nguyen et al., 2012; Deiss, 2004; Deodato, 2014; Durrance et al., 2005; Lankes et al., 2007; Tuominen, 1997). Others are enforcing an “access doctrine” that sidelines user agency (Greene, 2021).

Just as Illich (1973) critiqued professions and professionalism based on the exclusion of user-centered processes of control, professional identities are emerging that are seeing the need for more inclusive relationships with library users (Fichter, 2006; Huzar, 2014; Lankes et al., 2007; Morrone & Friedman, 2009; Roberto & West, 2003; Yoshida, 2016). While such collaborative librarianship has occurred for decades (Latham, 2013), it is increasingly becoming a standard (Lankes, 2011, 2016). Other critical scholars of public library interpretive schemes are challenging the ways in which professional identity is enacted (e.g. Higgins & Gregory, 2013; Good, 2006; Gray, 2013; Jensen, 2004; Pawley, 1998). At times, as Apetkar (2019) and Greene (2021) find, library staff bend and break library rules out of feelings of compassion and solidarity with library users. This theme of library workers choosing to NOT reinforce library policies, illustrates the tensions between the variants of the library faith and its interpretations, as well as the power enactments available to staff, administrators, and patrons (e.g. Aabø & Audunson, 2012; Audunson, 1999; Giesler, 2017; McKechnie et al., 2006). These scholars challenge library professional doxa and library faith tenets such as librarian neutrality, and the frameworks of information literacy that are currently en vogue. Librarians are investigating their own practices as power enactments and challenging their own previous narratives as they do so (Floegel et al., 2020; Williment, 2020).

Moreover, the already-complicated library faith imaginaire described above is by no means static or uncontested. In fact, the mainstream narrative of the development of public libraries, as elaborated by scholars such as Ditzion (1947), Molz & Dain (1999), and Garrison (1979) are countered by counternarratives by critical scholars such as Harris, Buschman (2003, 2005, 2007), and Raber (1997, 2003, 2007). Meanwhile, some scholars, such as Wiegand (1999, 2003, 2015a), Latham (2009, 2011, 2013) and de la Peña McCook (1997, 2000; de la Peña McCook & Barber, 2002), are writing across both narrative and counternarrative to fill in a picture of libraries in which both the institutional actors and users act in concert to expand what libraries can be, often against larger institutional or civic structures. The individuals that use libraries have both a library faith of their own, and enact power within and around that structure.

Appendix C: The Original Sensitizing Concepts

A Priori Codes

The codes were left deliberately vague, so as to not predispose me to believing I would encounter any specific behavior during the fieldwork. They are merely placeholder stubs or aides memoire that were fleshed out when I encountered them in the field. In addition, many other reasons, explanations, feelings, and enactments generated additional codes. These were not intended to be exhaustive.

Power/agency:

- Expressing instrumental power
- Expressing symbolic power
- Expressing informational power
- Expressing structural power (Braman, 2006)
- Further broken down into power phases: actual power, potential power, virtual power (Braman, 2006)
- Enacting 1st dimension of power
- Enacting 2nd dimension of power
- Enacting 3rd dimension of power
- Describing power expressed by institution
- Describing power blocked by institution
- Describing power facilitated by institution
- Describing power expressed by other users
- Describing power blocked by other users
- Describing power facilitated by other users
- Feeling like the agent in charge (reader/text/political economic structure)
- Power is located in the desired outcome of activity (pleasure/instruction)
- Power identified as an effect of making on the maker (beneficial/harmful)
- Power identified in the process of learning to read (a natural developmental process/a specialized process for experts) (the above four concepts are adapted from Ross, 2009)
- Identifying differential power enjoyed by different user groups

Conviviality

- Enacting self-governance
- Relational equity
- Relational expertise
- Relational agency
- Enacting ability to choose
- Enacting mutual assistance
- Enacting interdependence
- Exploring affordances of tools

- Realizing the tool is/is not convivial

Describing Library Faith

- Accomplishing library faith:
- Through democracy: citizenry, informed electorate, public decision-making and debate
- Through community: resilient, strong, close-knit, tolerant communities
- Through economy: entrepreneurialism, skill-building, jobs and money
- Through education
- Through social training/enculturating/replicating culture/social control
- Through social capital
- Through use of space
- Through literacies of various types
- Through access to information, tools

Living in the space

- Being aware of surveillance
- Being blocked by spatial components
- Wayfinding
- Observing utility of spatial arrangements
- Enjoying co-presence
- Disliking sharing of space
- Feeling at home in the space
- Feeling uncomfortable in the space
- Making sense of the space
- Exploring the space
- Feeling like some space is out of bounds
- Shifting sense of space in relation to occupants
- Shifting sense of space in relation to activities

Describing practice theory: Structuration theory & Certeau

- Duality of structure: enabling/constraining recursively
- Strategies
- Tactics

Makerspace/DIY key concepts

- Expressing autonomy
- Expressing a dispositional shift (i.e. a change in attitude or orientation toward objects and making; Sheridan et al, 2015)
- Expressing resistance
- Expressing surprise
- Accommodating failure
- Collaborating
- Sharing knowledge

- Being a leader
- Sharing leadership
- Struggling with process of making
- Assisting with process of making
- Building relationships with other users
- Feeling like part of the community of practice
- Finding common interests

Library staff-user relationships concepts

- Feeling supported by the staff
- Feeling oppressed by the staff
- Feeling supported by the users
- Feeling oppressed by the users
- Feeling supported by the trustees/community
- Feeling oppressed by the trustees/community
- Agreeing with the policies
- Disagreeing with the policies
- Feeling libraries should incorporate makerspace services
- Feeling libraries should not incorporate makerspace services
- Describing conflicts between different library goals or services
- Becoming aware of policy
- Shifting conception of policy
- Shifting conception of users
- Shifting conception of making
- Describing constraints on practices outside library's control

Reasons ascribed for having a makerspace

- Appearing technologically relevant
- Attracting and serving new groups of patrons
- Expanding services into new types of activities and mediums
- Encouraging social engagement or fun
- Promoting access to tools
- Providing skill-building opportunities
- Supporting the local and/or global economy
- Transforming the idea of the library from a sphere aimed at consuming ideas to one aimed at creating ideas

Appendix D: Codebook

Notes on the Coding Process: I did not code study-arrangement talk, or the "getting to know you" conversations. I coded anything that references a decision, choice, action, or other power enactment, as well as feelings and sense-making, relating past experiences, and hopes for the future.

These codes are usually written as unidirectional, but opposites were included in these codes, for example "wanting to see what others do in the space"—or NOT wanting to.

Subcodes

Each factor below is a sub-code that can amend the initial codes above. These are appended at the ends of the codes. For example "CUEN1" describes someone feeling energized or excited because of a staff interaction

- 1 Because of staff
- 2 Because of library as an institution
- 3 Because of tools
- 4 Because of rules/policies/procedures
- 5 Because of disposition, personality
- 6 Because of socioeconomic status
- 7 Because of others
- 8 Because of prior experience, skills
- 9 Because of success or failure
- 10 Because of scheduling/sharing
- 11 Because of spatial arrangements
- 12 Because of training/teaching from library
- 13 Because of other factor
- 14 Because of resources
- 15 Because of making, feeling of creativity
- 16 Because of design (UX, usability, or graphical design)
- N NOT--i.e. the opposite of the code's wording

Category Name	Code ID	Code	Example
Exposure – framing Identifying being exposed to ideas, concepts, uses of libraries, or possibilities in one's life or the life of the community (often new ideas). This category also deals with the way in which the institution or the larger narratives of making, orients the user to education, literacy, skills, creativity, innovation, and neoliberalism/market ideologies, and frames the space in light of those ideologies--making sense of the space and services for the users.			

Exposure – framing	EFSA	Sociocultural access: The space makes sense in the context of one's life	"It's clear to me that they don't feel welcome, that there's something that is not projecting or telegraphing to them whether subconsciously or in the design that's saying, "This isn't for you. Keep going," you know." Richard, Responsive
Exposure – framing	EFSM	Sense-making, figuring out the space or tools	"Sometimes they can just confuse you. It's like, you know, it's like, "Hey, he's not here." And you don't like to rush so it's like, "Oh maybe someone's in there." And you look in there, "Oh, he is in there."" Tyler, Responsive, talking about confusion about whether the recording space is available when someone is recording with the lights off
	EFFR	Needing to explain the space for others to understand	"I mean if I was telling a friend, I mean I'd like recommend everything. I probably wouldn't even tell them about it. I'd just show them because it kind of speaks for itself. You see it and it speaks louder than words could." Jack, Responsive
	EFXP	Exposing people to possibilities	"but really it's about getting people exposed to these ideas or these creative outlets and allowing people to imagine the possibilities" Alan, Responsive
	EFGP	Explaining the space as beneficial for particular groups	"I have no idea what this [waves hand] is about. Can I use this stuff? This looks like it's for certain people maybe, like you need to have credentials" Ariel, Productive
	EFNP	Feeling something is possible/not possible or supposed/not supposed to happen in space	"you know you can definitely prototype, but you know we can't use the space for woodworking you know we cant we just can't, we can't use the space for anything that's super messy. I'm not gonna be bringing my easel in here and painting in here" Erika, Responsive
	EFFS	Framing the space as a 21st century or good for library	"So if we had this really cool Makerspace and people were doing things with, they come in and check it out, anytime you can get good publicity for the library when it comes to the time of year to vote" Sue, Welcoming
	EFMI	Framing space in light of market ideologies	"our first student has been home schooled. He hasn't had a lot of social exposure and so there's room for great growth as he enters the workplace ...All of the rubrics are in the files that I'm going to be giving you so you can see what areas they're going to teach and then, you know, it will be using the technologies and tools within the Makerspace" Hannah, Welcoming

Exposure – framing	EDUS	Wanting/expecting people to access the space	"initially people did not use it. And we as trustees did not understand it. We really were...Most of us are older. We, even the younger people thought, "Okay, well you've got it. You've got all this stuff in there in drawers. Now, let's see it in action." At least that was my thought. Like, okay, this is nice. We spent the money. We have it. It looks nice in here. But I wanted to see somebody in here. Every time I came in, there was no one in here. It was all sterile. I mean, it was clean, nothing was out. Everything was in the drawers." Wendy, Welcoming
	EFSR	Framing the space in terms of OTHERS/delegitimizing one's own making	"It's not my making that matters here, it's people who need to build themselves up, get a job, get some skills." Aiden, Responsive
	EFLB	Explaining the space as fitting with library faith	"I'd say in a million years from now when they dig up this place, what we have will define what our civilization was like. So storage and sharing." Caleb, talking about alignment between general library and makerspace missions, Productive
	EFCV	Framing the space as a convivial tool (at least some aspects of convivial)	"it's the only room in the community that is ever whatever the community wants it to be really. You can come here and it can be your music club, it can be your design studio, it's whatever you need it to be, that's what it is." Megan, Welcoming
	EFEM	Framing space as empowering, liberatory	"For me it's this wonderful, electricity vibe, vibrant life thing that it happens when people interact with each other and maybe a skill or something information but it produces this equality maybe. It produces confidence empowerment for lack of a better word, joy. It's kind of like an individual fulfilling his or her potential. And I so completely believe that libraries can facilitate that and should." Robin, Welcoming
Uplift – Fun Identifying the reasons, ends, or goals of the space or the activities within it. Are these based in some sort of uplift, including learning or other "good-for-you" rhetorics? And/or are the spaces positioned as instrumental for things other than education or moneymaking, such as fun, creative self-expression, etc. There can be significant overlap—for example people learn AND have fun expressing themselves at the same time. Determining "appropriate" uses of the space, and the preferences one has for serious or casual leisure uses.			
Uplift - Fun			
	UFEC	Understanding ends: economic benefits, innovation, business development and support	"Now if they came to me and say they were prototyping some part for a refrigerator or something, I'd try to work something out for them." (as opposed to sex toy, which would be limited by 2-hour print allocation. Chuck, Productive
	UFPL	Understanding ends: play, fun	"I just love coming in here and trying stuff out, it's like playing with big kids toys...it's so fun and also sort of a break from the real world" Felicia, Productive

Uplift - Fun	UFLN	Understanding ends: learning, skill-building	"It's definitely for kids to you know, get those 21st century skills for good jobs. Learning to make stuff can really benefit them" Jerry, Welcoming
	UFDF	Understanding ends as different from what the participants want	"maybe it's just about learning stuff too, like you can come learn to use the recording studio, but you can't really record there for real." Logan, Responsive
	UFEX	Understanding ends: creativity or self-expression, making for its own sake	"I just basically have told people like, it's a really great space where there's a lot of different crafting, but then like also the studio where you can record yourself. It's a very well thought out space, I think. I love the design in here and it's clean, functional. It's got a lot of really--outlets for creativity which I think is great." Tessa, Responsive
	UFOT	Understanding ends: uplift for less well-off/Other	"learning that stuff will be like lifting up that whole community, because they don't have other ways to learn that stuff" Jim, Productive
	UFDY	Understanding ends: Different relationship with stuff, self-reliance	"not only can you look at something and say, "Hey, I created that," but then you have the knowledge about how it was created. You didn't just pay money to just go out and buy this object" Victor, Productive
	UFBS	Wanting to build skills, even if or because something is hard or challenging (aligns with serious leisure)	"this is really hard to do but it's rewarding because it's so hard." soldering librarian at Productive, fieldnotes 5/7
	UFDS	Dismissing own's use of the space as less important than others'	He said he knew other people were making important things in the space, like "real" prototypes but that "I just like to give stuff I make to people." Brent, fieldnotes, 5/21, Productive
	UFSL	Identifying serious leisure use (or preference for it)	"I want to just sit here for hours with these other women and practice and learn so I can become better at this. I see how my skills have expanded since your programs and I want to build them up even higher...but I know it's going to be a long hard job to learn more." Linda
	UFCL	Identifying casual leisure use (or preference for it)	"They come with their friends and they want to sit down and do a craft and take something home" Olivia, Responsive

Access – Barriers

Identifying the way individuals or groups have access, or the barriers to access. These can include physical barriers of things like time, money, not enough tools or the right tools, etc. Or it can be intellectual access--the skills or abilities to use the space and tools. It can also involve emotional labor, such as the work done to ask questions, make people feel welcome, and so on, when that prohibits or enables access. In addition, this category involves discussion of access as a reason for the spaces or for libraries more broadly, and intellectual freedom to access materials/tools/etc.. Sociocultural access is discussed in Exposure - Framing.

Access - Barriers	ABPH	Feeling one has physical access to the necessary tools (or N=that it is blocked)	"I can't believe I thought this space was so great, I guess I was just overwhelmed by how great it was to have free access to all this equipment, when I used to have to pay so much—Really you can't do much here. The tools are here, but the rules get in the way." Sean, Productive
	ABLB	Legitimizing limits to access	"I'm not helping you design files that I know are copyright infringements. You know, I'm not helping you set them up." Jenna, Productive
	ABCS	Describing cost to access or accomplish goals	"frankly if you have to have a library card to do the [makerspace], half of my patrons can't do it, because they don't have library cards or they're blocked to the point where they have \$300 worth of fines" Madison, Responsive
	ABCO	Describing constraints on practices, MAKING	"Storage is in high demand in every makerspace, but other spaces I've been in typically have enough room for at least medium sized projects for every member. There is sometimes even limited availability to leave large projects in place for a period of time" Roger, Responsive
Access - Barriers	ABIN	Feeling one has intellectual access to space, skills, knowledge (N = includes not knowing what one doesn't know)	"don't know what I would do that stuff I don't know how to use it" Anthony, Responsive
	ABEL	Describing emotional labor in accessing space/tools/knowledge/relationships	"because I think that maybe they don't understand and they feel intimidated. And they don't understand anything and they don't know how to just come and ask... And asking one question seems to be acceptable with the associates, but if you ask this question and that question, this question and that question, about the equipment or about the computer or whatever, then people start... You could easily start to feel intimidated." Rose, Responsive
	ABIF	Speaking of intellectual freedom, freedom to make, also intellectual property	"Let's say our state senator stopped at the library, which he does occasionally. He used to be on the board, very conservative approach and he happens to walk by our giant windows and in the back somebody's almost done printing a 3D dildo. So we're not sure that we could handle that reaction. What would happen after that. We probably can't deal with that." Justin, Responsive

ABNO	Saying there is nowhere else to access the things offered in library space	"There is really, there is no other spaces in this area for kids to get hands on training, in some cases life skills. I mean the school doesn't even have has some of these things they are not getting it in school. I mean my daughter doesn't get or music in school and she won't until she is high school." Lisa, Welcoming
ABTM	Describing time resources to access or accomplish goals	"People don't want to come in again. They want you to help them right then. They've taken time out of their lives to come there. And they don't want to take another time" Jenna, Responsive

Communal – Individual

Identifying the goals achieved through/despite interdependence: benefits, uses, or problems of the space for individuals or for community or social impact. Also, naming a desire or the fact that one can make social connections in the space, the value of social connections, or otherwise identifying that other people are a beneficial aspect of the space. This includes thoughts about how the use of the space is not just about an individual's use of the tools, but the space can/should also build social capital, community, or social networks.

Communal - Individual	CIRY	Relying on others to accomplish goals	"The tool to use another tool" Dylan, Responsive, talking about his dad, because he cannot use the space unless his dad is there because he is only 11
	CIRE	Wanting to form or develop relationships in the space (collaborate, hang out or hold social events, for example)	"I'm going to end up just interacting with my...I mean we were here the other day and there was a boy doing the LittleBits too, so we were talking with him, you know... so that, but as far as building relationships, probably not." Tessa, Responsive
	CIIN	Identifying individual needs of space as important	CIINN "this space is really not about an individual artists needs and wants, its really more about how to utilize the space and still be respectful of everyone else" Erika, Responsive
Communal - Individual	CICN	Identifying community needs of space as important, or particular groups other than ones speaker affiliates with	"Young men, it's the white whale...A population that was not excited to come here before." Leslie, Responsive
	CINS	Describing the need to share resources that are expensive	"but I think library is becoming a word for more than just a place where you can have books space. I think that the library is becoming a word for things that the community would like and things like that. You don't buy things. It's not like a store. It's like... just a space where you can use resources you couldn't use at home because we can't afford them." Dylan, Responsive
	CINT	Describing interactions with others in the space, socially make, collaborate	"yeah, it's just things that happen in conversation. Less on collaboration, but what brings people together the most is the button makers. I guess because it's just like you're all sitting at the table and doing a button activity" Liam, Productive, describing informal interactions

CISE	Wanting to see what others do in space, or enjoying others' making	"You can't even see what other people are doing because all the chairs face the walls, much less collaborate" Sophia, Productive
CIBC	Describing building community relationships or supporting community needs, including gift-giving	"when we made stuff together, we were making the community proud and we were building up our community" Robin, Welcoming
CIFF	Feeling like the distribution and use of resources is fairly allocated	"You only say yes if you are willing to do it for every patron we serve because-- We cannot create, have favoritism or cannot say that one patron is more important than another." Jenna, Productive
CICL	Learning or making because of others, (or N= despite them)	"I have learned from them. There is a two-way street to learning stuff. And there's all kinds of weird things that they're doing. They didn't go to school to be designers or anything." Colin, talking about users in library, Productive
CISH	Describing problems/delays around sharing space or tools	"I was changing the filament, but then he canceled it. And then he changed it back to red. So that... I was kind of mad about that because I was just about ready to put everything on and stuff." Jack, Responsive

Subject – Object

Identifying positionality in terms of who is capable of making decisions or acting--is the user the subject of the services (which are decided by the subject as an active participant) or is one the object of the services (which are decided by others, with the user as the more or less passive recipient of services/actions) or some variant between. Naming a desire or the fact that one wants to be, or is, in charge of what one does or how one does it in light of the space or tools. Naming one's own agency or that of other users as important. Also Help/control: Identifying issues of helping one another and/or controlling how one may interact in the space. Also identifying issues of being helped or controlled. Potential outcomes, including failure, that are allowed or controlled for. Includes concerns that the institutional actors might take over projects, not allow failure, or otherwise control the "success" of the activities on the space. Includes a range of outcomes or contingencies that are identified as important to the person.

Subject - Object	SOCT	Describing an allowance of contingency, including failure and safety issues	"I think failure is an important part of the learning process—If you don't fail you can't learn, really. She helped me to get this banner but she didn't let me fail, so she didn't let me learn." Layla, Productive
	SOSU	Describing feeling like (or wanting to feel like) the subject, or agent in charge, having power/autonomy (N=Feeling like the object of others' agency, being acted upon)	"do I feel like I have power here? Well, no, but I mean other than the... but I do feel welcomed here and I think that that's an important distinction. So I don't need to have power here" Fred, Responsive
	SOHP	Describing help, from institution or other agents, or helping	"He said he'd just milled around in increasing desperation until Colin came and oriented him." (Roderick, fieldnotes 5/16, Productive)

	SOCN	Describing control or feeling "taken over," from institution or other agents, or controlling users	Kent's daughter returned from her 3d printing and seemed slightly dejected. Evidently Randall had pushed all the buttons when it was time to print, and she felt like it wasn't really her project anymore. Kent seemed a little annoyed, saying she was perfectly capable of doing it herself (fieldnotes 5/8), Responsive
	SODC	Making decisions on behalf of space or users, choosing what will happen	SOCN "We're not trying to force anything on anybody, it is just here for people to use and to change it, if people want more stuff." Sue, Welcoming
	SOGB	Describing a desire to "give back" or enrich the space	"I would like to come and teach these kids about being scammed by unscrupulous producers, how to keep their names and their rhymes, but I don't think these library folks would let me" Perry, Productive
	SORS	Resisting being an object of others' control or help	"then like I wouldn't really do what I want to do, which is make sure that 10-year-olds could do it without having their parents have to go through all that badging thing if they're not interested." Chloe, Responsive, talking about wanting to change the rules so younger kids didn't need parental accompaniment to use space
	SOAR	Assigning responsibility for access or success	"I can give you a list of things you need to know. Am I specifically going to sit down and tell you and make you figure it out with me? No. You're on your own to learn about how to do these things. But I will give you a list of things you need to know" Jenna, Welcoming
	SORM	Defining "real" making for others	"I wish they had some way to help people who are doing real work here, instead of the guys just playing with the computers" Jordan, Productive
	SOUH	Responding to user governance, help or input	"We're established kind of an on-demand collection development, that if somebody comes in and wants something that's not cost-prohibitive for... It fits in with our collection development policy, we're going to order it for them, we're gonna get it for them." Sue, Welcoming
	SOTL	Wanting to be told what to do (or N= not to be)	"I'd like other people's ideas. Maybe initially more with other people, until I...[feel more comfortable]" Pam, Welcoming
Comfort – Unease Identifying awareness of comfort or unease, physical, mental, or emotional. This comfort/unease could be in relation to certain tools or activities, to the idea of makerspaces in libraries, dispositional, or in any other area. Includes the "fear of the blank page" doubts and concerns.			
Comfort - Unease	CUCM	Feeling comfortable in the space due to...(amended with subcodes)	CUCM14 "But if I'm like just you know, having a bad day and I just wanted to decompress, yeah I'll come down here and I'll do something like... For me it is a relaxing thing just like DIY and crafting [machine sounds] is a relaxing thing" Chloe, Responsive

Comfort - Unease	CUBL	Feeling like you belong (or N=don't belong, ignored)	"Yeah, my self-esteem is really low, so it just...I thought that people were gonna look at me. I don't know why, I always feel that way, I feel judged. But nobody's done that to me." Abby, Welcoming
	CUSE	Feeling comfortable related to one's socioeconomic status in the space	CUSEN1 "I know I seen so white people come into use these computers and the Librarians treat them real nice. So I think this place is.. I don't know I just think maybe they tolerate us sometimes" Anthony, Productive
	CUDS	Expressing a shift in disposition	"It feels amazing to be able to do something I never thought I could do--now I am like a woodworker person" Yolanda, Welcoming
	CUCH	Describing comfort with change, "newness"	CUCHN "She wants me to read these, I guess. I don't know why it's so important to her, but I'll do it [big sigh]. You know, my mom really likes old-fashioned things, but I like new stuff more" Tyler, fieldnotes 9/6, Responsive
	CUAD	Feeling comfortable with adapting the space to one's needs	"This space is made for me to do whatever I need to, I mean they aren't going to care about the chairs." He pointed out the drop down electrical outlet he was using, "See, it's made for us to move stuff around." (George, fieldnotes 8/4, Responsive
	CUOB	Describing power differentials	"They are in charge and you are nothing--they look at you like you are nothing" Luisa, Productive
	CUEN	Feeling energized, happy, excited (or N= overwhelmed, bored, unhappy)	"I was so excited to add this skill to my jewelry making and to know I could now create the whole look...so I just kept getting more and more excited and wanting to come down here and make more" Sabian, Productive
	CUFS	Feeling encouraged, supported (or N= frustrated, discouraged)	CUFSN1 "And I was just interested in coming down here and using this machine. So I already know how to sew." And so I just decided to just not talk to her anymore, because I didn't... I don't know, it just may be how she speaks or something. But I just thinking, and I don't measure it on me, because I can function" Rose, Responsive
	CULD	Describing comfort in leadership/teaching	"I like teaching because I learn more that way... and I know I can get people excited about what I am excited about" Travis, Welcoming

		NCUIN "He mentioned wanting some sort of t-shirt that said "Staff: Ask Me Anything" or something like that, but it was not allowed. He said he wanted more orientation signage, but that was not allowed either. He did not know why such ideas were shot down, but he said he wasn't going to "make waves."" Colin, field notes 5/4
Trust – Doubt Identifying issues of social trust—trust in users, trust in libraries. Trust in the process of making, trust in decision-making, skills, and awareness. Trust in change and awareness of shift or 'new vs. old' binary thinking in libraries, or that the things that appear new are not. Trust in one's own abilities. Also having to do with the focus of library services through social interaction and/or through use of media/tools. Which tools, people, or sources are trusted to be authoritative or legitimate.		
Trust - Doubt		
TDTs	trusting staff/ institutional choices & help	"No, man, they're never going to let us do our thing there. We are cussing all the time. Those librarians are gonna kick us out." Xavier, Responsive
TDOT	trusting other users	"I don't know, it feels like no one here would mess with my stuff" Perry, Productive
TDFL	Expressing whether the participant feels trusted or (N) disparaged, untrustworthy, unworthy	"you think I'm gonna be dainty because I'm in a dress--no. But I do think what a pattern I have seen--and it could just be who's teaching the classes--but people definitely lean toward Justin for the 3d printer" Olivia, Responsive
TDME	trusting one's own self to be able to meet goals (trusting "me")	"Hunter said he'd never done it, but he was sure he could figure it out. He dove right into the project while Tanya tentatively asked him to look over every step of the project" Hunter & Tanya, fieldnotes 5/13, Productive
TDSF	Trusting one is safe, or others are	TDSFN "I understand why they don't want to put a woodshop in. It would be cool if we had like one Miter saw that the staff used" Liam, Productive
TDUS	trusting users (as a library actor or institutional actor, not a user)	"go ahead and change it, just don't let Jenna see it," Joe, talking to Sean about changing filament in Productive
TDFB	trusting that one's feedback, ideas or abilities will be taken seriously by the institution	"you give the toddler the illusion of choice but you have already said that these 3 things are fine, there were I understand that we were simply an advisory council that's how it is we're we advised the library council on various things and the library council every now and again would throw us a bone and say yes go ahead and choose one of these 5 things" Wyatt, Responsive
TDUN	trusting one's own understanding	"I thought I knew what this all was about [3d printing\] but then I took that class and realized I don't understand it at all" Reuben, Welcoming

Trust - Doubt			"I wouldn't want a say in anything. I trust the librarians to know what's best, you know? They are the experts. I don't know much about what [the city] needs, but they seem to know." Sylvie, fieldnotes 9/15, Responsive
TDDC	trusting decisions or choices		
TDLI	Feeling lied to or manipulated, skeptical, or as if there is masking/subterfuge		"There are the optics and then there's the way things ARE...you expect libraries to be more honest" Sean, Productive

Appendix E: Institutional Review Board Materials

This short form for adults was developed in response to the need to get informed consent from

INFORMED CONSENT
UW - Milwaukee

IRB PROTOCOL NUMBER: 16.309
IRB Approval date: 4/5/2016

University of Wisconsin – Milwaukee
Consent to Participate in Research

Study Title: Convivial Making

Person Responsible for Research: Joyce Latham, PhD, Associate Professor, School of Information Studies. Student Investigator: Shannon Crawford Barniskis, Doctoral Candidate, University of Wisconsin-Milwaukee School of Information Studies

Study Description: The purpose of this study is to answer questions about how the library users, personnel and other stakeholders interact, share power and governance decisions, use tools and space, and learn, teach, or create together. This study is a multisite case study which explores public library makerspace practices, policies, and perceptions in three different public library creative places, where people use shared tools and collaborate on creative projects. Up to 177 people will participate in the study. This will take approximately 10-30 minutes of your time.

Risks / Benefits: Risks that you may experience from participating are considered minimal. There are no costs for participating. There are no benefits to you other than to further research.

Confidentiality: All information collected about you during the course of this study will be kept confidential to the extent permitted by law. We may decide to present what we find to others, or publish our results in scientific journals or at scientific conferences. No information that identifies you personally will be released without your written permission. Only the PI Dr. Joyce M. Latham, and student researcher Shannon Crawford Barniskis will have access to the information. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review this study's records.

- Your information will be recorded using coded pseudonyms. The only data that identifies you—this consent form—will be stored separately from all other data, in a locked box in a secure location.
- Any identifiable information collected will be stored in a locked cabinet, or stored on a password protected computer.
- De-identified or anonymized information will be indefinitely stored in an open-access data repository for secondary analysis and use. However all, identifiable data will be redacted or scrubbed from this stored data. Any identifiable data will be destroyed after 02/01/2018.

Voluntary Participation: Your participation in this study is voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the University of Wisconsin Milwaukee or the library.

Who do I contact for questions about the study: For more information about the study or study procedures, contact Shannon Crawford Barniskis at crawfo55@uwm.edu.

Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at 414-229-3173 or irbinfo@uwm.edu.

Research Subject's Consent to Participate in Research:

To voluntarily agree to take part in this study, you must be 18 years of age or older. By signing the consent form, you are giving your consent to voluntarily participate in this research project.

Printed Name of Subject/Legally Authorized Representative

Signature of Subject/Legally Authorized Representative

Date

Research Subject's Consent to Audio/Photo Recording:

It is okay to audiotape me while I am in this study and use my audiotaped data in the research.

Please initial: ____ Yes ____ No

It is okay to photograph me (hands only) while I am in this study and use my photographed data in the research and scholarly publications or scholarly presentations of the research.

Please initial: ____ Yes ____ No

people who were intimidated by the longer form:

UNIVERSITY OF WISCONSIN – MILWAUKEE
PARENT CONSENT AND CHILD ASSENT TO PARTICIPATE IN
RESEARCH

THIS CONSENT FORM HAS BEEN APPROVED BY THE IRB FOR A ONE YEAR PERIOD

1. General Information

Study title:

Convivial Making

Person in Charge of Study (Principal Investigator):

Joyce Latham, PhD, Associate Professor, School of Information Studies

Student Investigator: Shannon Crawford Barniskis, Doctoral Candidate, University of Wisconsin-Milwaukee School of Information Studies

2. Study Description

You are being asked to participate in a research study. Your participation is completely voluntary. You do not have to participate if you do not want to.

Study description:

The purpose of this study is to answer questions about how the library users, personnel and other stakeholders interact, share power and governance decisions, use tools and space, and learn, teach, or create together. This study is a multisite case study which explores public library makerspace practices, policies, and perceptions in three different public library creative places, where people use shared tools and collaborate on creative projects. Up to 177 people will participate in the study. Your participation can occur over a few minutes, or could last for a few hours, depending on the research activities in which you consent to participate.

3. Study Procedures

What will I be asked to do if I participate in the study?

- If you agree to participate you will be asked to allow the researcher to observe your activities in the makerspace provided by this library. This will last as long as you are present in the space or until you choose to opt-out of further observation.
- The researcher may talk with you about the space or your use of it, informally, or may seek to work on projects together if you agree. This will last as long as you are present in the space or until you choose to opt-out of further conversation or participation.
- If you choose, I will interview you in the makerspace or in a separate room in the library. An interview will last from 30 minutes to an hour. It will be audiorecorded if you choose to allow it, so I may quote you accurately.
- The researcher may ask to photograph you using the space, but will only photograph non-identifiable parts of you, such as your hands, and you will be able to approve or disapprove the use of any photographs you consent to have taken. These photographs are intended to provide visual clues as to how the space and tools are used.
- The researcher may ask you to draw a map of the library or sketch the project you are seeking to create in the makerspace. This could take 5-15 minutes.
- If you refuse to be recorded or photographed, or any of these individual tasks, you may still participate in the study.

- YOU decide how much or how little you would like to participate, and all levels of participation are appreciated and useful for the study

4. Risks and Minimizing Risks

What risks will I face by participating in this study?

- There are no foreseeable risks for participating in this research study.
- The study minimizes any potential physical, psychological, and social risks by not seeking sensitive information, by protecting your privacy through anonymizing and de-identifying any data you provide, and by allowing you to choose how and the extent to which you participate.

5. Benefits

Will I receive any benefit from my participation in this study?

There are no benefits to you other than to further research.

6. Study Costs and Compensation

Will I be charged anything for participating in this study?

You will not be responsible for any of the costs from taking part in this research study.

Are subjects paid or given anything for being in the study?

You will not be compensated for taking part in this research study

7. Confidentiality

What happens to the information collected?

All information collected about you during the course of this study will be kept confidential to the extent permitted by law. We may decide to present what we find to others, or publish our results in scientific journals or at scientific conferences. No information that identifies you personally will be released without your written permission. Only the PI Dr. Joyce M. Latham, and student researcher Shannon Crawford Barniskis will have access to the information. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review this study's records.

- Your information will be recorded using coded pseudonyms. The only data that identifies you—this consent form—will be stored separately from all other data, in a locked box in a secure location.
- Any identifiable information collected will be stored in a locked cabinet, or stored on a password protected computer.
- De-identified or anonymized information will be indefinitely stored in an open-access data repository for secondary analysis and use. However all, identifiable data will be redacted or scrubbed from this stored data. Any identifiable data will be destroyed after 02/01/2018.

8. Alternatives

Are there alternatives to participating in the study?

There are no known alternatives available to you other than not taking part in this study.

9. Voluntary Participation and Withdrawal

What happens if I decide not to be in this study?

Your participation in this study is entirely voluntary. You may choose not to take part in this study. If you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the University of Wisconsin Milwaukee.

If you withdraw from the study we will use the information collected to that point.

10. Questions

Who do I contact for questions about this study?

For more information about the study or the study procedures or treatments, or to withdraw from the study, contact:

Dr. Joyce Latham
School of Information Studies, University of Wisconsin-Milwaukee
P.O. Box 413, 2200 E. Kenwood Blvd.
Milwaukee, WI 53201-0413
(414) 229-3205

Who do I contact for questions about my rights or complaints towards my treatment as a research subject?

The Institutional Review Board may ask your name, but all complaints are kept in confidence.

Institutional Review Board
Human Research Protection Program
Department of University Safety and Assurances
University of Wisconsin – Milwaukee
P.O. Box 413
Milwaukee, WI 53201
(414) 229-3173

11. Audio or Video recording or Photographs

Research Subject's Consent to Audio/Photo Recording:

It is okay to audiotape me while I am in this study and use my audiotaped data in the research.

Please initial: ____ Yes ____ No

It is okay to photograph me while I am in this study and use my photographed data in the research and scholarly publications or scholarly presentations of the research.

Please initial: ____ Yes ____ No

12. Signatures

Minor Research Subject's Assent to Participate in Research:

I have read, or someone has read to me, this entire consent form including the risks and benefits. I have had all of my questions answered. I understand that I may stop participating in

the study at any time. I understand that by signing on the line below I am agreeing to take part in the study.

Printed Name of Minor Subject

Signature of Subject

Date

Parental/Guardian Consent:

I have read or had read to me this entire consent form, including the risks and benefits. I have had all of my questions answered. I understand that I may withdraw my child from the study at any time. I am not giving up any legal rights by signing this form. I am signing below to give consent for my child to participate in this study.

Printed Name of Parent/Guardian

Signature of Parent/Guardian

Date

Principal Investigator (or Designee)

I have given this research subject information on the study that is accurate and sufficient for the subject to fully understand the nature, risks and benefits of the study.

Printed Name of Person Obtaining Consent

Study Role

Signature of Person Obtaining Consent

Date

Informed Consent

Version: 1.0

IRB Protocol Number: 16.309

IRB Approval Date: 4/5/2016

UNIVERSITY OF WISCONSIN – MILWAUKEE

CONSENT TO PARTICIPATE IN RESEARCH

ADULT CONSENT FORM

THIS CONSENT FORM HAS BEEN APPROVED BY THE IRB FOR A ONE YEAR PERIOD

1. General Information

Study title:

Convivial Making

Person in Charge of Study (Principal Investigator):

Joyce Latham, PhD, Associate Professor, School of Information Studies

Student Investigator: Shannon Crawford Barniskis, Doctoral Candidate, University of Wisconsin-Milwaukee School of Information Studies

2. Study Description

You are being asked to participate in a research study. Your participation is completely voluntary. You do not have to participate if you do not want to.

Study description:

The purpose of this study is to answer questions about how the library users, personnel and other stakeholders interact, share power and governance decisions, use tools and space, and learn, teach, or create together. This study is a multisite case study which explores public library makerspace practices, policies, and perceptions in three different public library creative places, where people use shared tools and collaborate on creative projects. Up to 177 people will participate in the study. Your participation can occur over a few minutes, or could last for a few hours, depending on the research activities in which you consent to participate.

3. Study Procedures

What will I be asked to do if I participate in the study?

- If you agree to participate you will be asked to allow the researcher to observe your activities in the makerspace provided by this library. This will last as long as you are present in the space or until you choose to opt-out of further observation.
- The researcher may talk with you about the space or your use of it, informally, or may seek to work on projects together if you agree. This will last as long as you are present in the space or until you choose to opt-out of further conversation or participation.
- If you choose, I will interview you in the makerspace or in a separate room in the library. An interview will last from 30 minutes to an hour. It will be audiorecorded if you choose to allow it, so I may quote you accurately.
- The researcher may ask to photograph you using the space, but will only photograph non-identifiable parts of you, such as your hands, and you will be able to approve or disapprove the use of any photographs you consent to have taken. These photographs are intended to provide visual clues as to how the space and tools are used.
- The researcher may ask you to draw a map of the library or sketch the project you are seeking to create in the makerspace. This could take 5-15 minutes.

- If you refuse to be recorded or photographed, or any of these individual tasks, you may still participate in the study.
- YOU decide how much or how little you would like to participate, and all levels of participation are appreciated and useful for the study.

4. Risks and Minimizing Risks

What risks will I face by participating in this study?

- There are no foreseeable risks for participating in this research study.
- The study minimizes any potential physical, psychological, and social risks by not seeking sensitive information, by protecting your privacy through anonymizing and de-identifying any data you provide, and by allowing you to choose how and the extent to which you participate.

5. Benefits

Will I receive any benefit from my participation in this study?

There are no benefits to you other than to further research.

6. Study Costs and Compensation

Will I be charged anything for participating in this study?

You will not be responsible for any of the costs from taking part in this research study.

Are subjects paid or given anything for being in the study?

You will not be compensated for taking part in this research study

7. Confidentiality

What happens to the information collected?

All information collected about you during the course of this study will be kept confidential to the extent permitted by law. We may decide to present what we find to others, or publish our results in scientific journals or at scientific conferences. No information that identifies you personally will be released without your written permission. Only the PI Dr. Joyce M. Latham, and student researcher Shannon Crawford Barniskis will have access to the information. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review this study's records.

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- De-identified or anonymized information will be indefinitely stored in an open-access data repository for secondary analysis and use. However all, identifiable data will be redacted or scrubbed from this stored data. Any identifiable data will be destroyed after 02/01/2018.

8. Alternatives

Are there alternatives to participating in the study?

There are no known alternatives available to you other than not taking part in this study.

9. Voluntary Participation and Withdrawal

What happens if I decide not to be in this study?

Your participation in this study is entirely voluntary. You may choose not to take part in this study. If you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the University of Wisconsin Milwaukee.

If you withdraw from the study we will use the information collected to that point.

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(414) 229-3205

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Institutional Review Board
Human Research Protection Program
Department of University Safety and Assurances
University of Wisconsin – Milwaukee
P.O. Box 413
Milwaukee, WI 53201
(414) 229-3173

11. Signatures

Research Subject's Consent to Participate in Research:

To voluntarily agree to take part in this study, you must sign on the line below. If you choose to take part in this study, you may withdraw at any time. You are not giving up any of your legal rights by signing this form. Your signature below indicates that you have read or had read to you this entire consent form, including the risks and benefits, and have had all of your questions answered, and that you are 18 years of age or older.

Printed Name of Subject/ Legally Authorized Representative

Signature of Subject/Legally Authorized Representative

Date

Research Subject's Consent to Audio/Photo Recording:

It is okay to audiotape me while I am in this study and use my audiotaped data in the research.

Please initial: ____ Yes ____ No

It is okay to photograph me while I am in this study and use my photographed data in the research and scholarly publications or scholarly presentations of the research.

Please initial: ____ Yes ____ No

Principal Investigator (or Designee)

I have given this research subject information on the study that is accurate and sufficient for the subject to fully understand the nature, risks and benefits of the study.

Printed Name of Person Obtaining Consent

Study Role

Signature of Person Obtaining Consent

Date

Appendix F: Handouts and Posters

This library is a research site



Are you willing to participate in a study of public library creative places, "Convivial Making?"

What's happening here?

With your consent, a researcher will:

- Chat with you
- Observe your use of this space and the tools in it
- Work on projects with you
- Take photographs of your HANDS ONLY, as you work

More details at:
<http://goo.gl/7fcBdn>



You must sign a consent form to participate in the study. Please feel free to say "yes" to only some research activities, "yes" to all research activities, or "no" if you're not interested.

UNIVERSITY of WISCONSIN
UWMILWAUKEE School of **INFORMATION** STUDIES

Study #16.309, approved by the Institutional Review Board, UWM

Poster

UNIVERSITY of WISCONSIN
UWMILWAUKEE

School of
INFORMATION STUDIES

Hello,
I'm Shannon
Crawford Barniskis,
a Doctoral Candidate at the
University of
Wisconsin-Milwaukee
School of Information
Studies

This library is a research
site, and I'd love to
talk to you.

I'm studying library
makerspaces and their impact
on users. More details are at:
<http://goo.gl/7fcBdn>

Or contact me at
crawfo55@uwm.edu



*Are you willing
to participate in a
study of public
library creative
places, "Convivial
Making?"*

**What's
happening here?**

I am:

- Chatting with people using this space
- Observing the use of this space
- Also using the space, and I'd love to work with with you, or assist
- Taking photographs of people's HANDS ONLY, as they work

Please feel free to say
no if you're
not interested, or
yes to some or all
research activities.

Handout to patrons

DO YOU HAVE A MAKERSPACE?

or other type of creative place in your library—even an occasional or pop-up space?

//////////

This study is approved by the UWM Institutional Review Board, study #16-309





I am seeking three locations to do a multi-sited ethnography of makerspaces in public libraries.

Participating in the “Convivial Making” study would entail me coming to your library for a month, observing, participating in makerspace activities, and interviewing any patrons, library personnel, library trustees, and local politicians that consent to participate in the study.

Willing to consider it?

PLEASE CONTACT ME

Shannon Crawford Barniskis
 Doctoral Candidate, University of Wisconsin School of Information Studies

crawfo55@uwm.edu



I'm looking for the following types of libraries and creative spaces, which allow adults to use the space (in addition to, or instead of minors):

- ⊙ A rural, suburban, or urban library
- ⊙ A “pop-up” space for at-will use
- ⊙ A permanent space for public use
- ⊙ A makerspace with digital production tools
- ⊙ A makerspace that supports arts creation
- ⊙ A makerspace that involves a community kitchen
- ⊙ Any type of shared public space for social, collaborative creation, that is affiliated with a public library

It's obvious what's in this for me: a PhD, dissertation, articles, and personal satisfaction. For the profession, this study offers obvious benefits as well—little has been studied about library makerspaces, and we don't yet know what the impacts of such services are.



But what's in it for you? I am willing to be a free maker-in-residence over the course of the study, offering a weekly free program, ongoing patron assistance in the makerspace, and at the end of the month I will offer you free consulting services.

I have provided hundreds of creative programs over the 19 year career as a librarian, have been hired by many other libraries to provide programs, and have been a library consultant for 15 years. For the free programs, I can teach basic circuitry and e-textiles, 3D printing, gardening, knitting, felting, spinning, cooking, writing, beading and jewelry making, art quilting, paper making, printmaking, book binding, and a wide variety of other classes, as long as you provide supplies. I can provide references for my classes. I provide consulting services on policy, space and future planning, and makerspaces.



Other concerns you may have about allowing a researcher to study your library, patrons, and staff:

Privacy and Ethics—if I were asked to host a researcher in my library, my primary concern would be about the privacy of my patrons and other ethical concerns. This study will be run in accordance with strict Institutional Review Board principles, with consent required from all participants. I will not bother or badger patrons because I believe each person has the right to use the library privately, but I will ask if I may observe them and/or interview them. They must consent on an opt-in basis before I will observe them, not like those studies that say “if you enter this space, you have consented to be studied,” which I believe are unethical. I teach ethics courses at my university, and ground all of my work in strong ethical principles.



Time—I will make some demands of staff time, though very little. I hope to interview as many staff as are willing, and each interview may take up an hour of their time. I may wish to interview the major players in providing the makerspace more than once. I will need a tour of the library, and will ask ongoing questions that should eat up minimal time. As a long-time public librarian, I understand the incessant burdens on staff time, and will keep my demands to a minimum.

Cost—There is no cost to the library for this study.

If you are willing to consider being a site for this study, please contact me at crawfo55@uwm.edu. I am happy to discuss any other concerns, logistics, or other thoughts you might have regarding the study.

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Appendix G: Semi-structured interview questions

- Please describe this space.
- Walk me through your first introduction to the idea of the makerspace in the library. What has this space enabled you to do?
- Are there things you'd like to do but cannot, and why?
- Has there been an instance in which there was something you couldn't do here? Walk me through it.
- Has there been an instance in which there was something you COULD do because of the space? Walk me through it.
- Tell me about the tools in the space, and how you use/offer them.
- Tell me about the spatial arrangement, and how you use/planned it.
- Tell me about the social interactions in this space, and how you use/facilitate them.
- How are rules/policies applied in the space?
- How useful is the space in your life/for the community generally/for the library as an institution?
- What would make it more useful?
- Who has a say in what happens here, or the tools and other resources offered (i.e. shared governance)?
- Would you want more input or say in what happens here, or the tools and other resources offered?
- What would be the drawbacks and benefits of allowing more shared governance in the space?
- How did your staff have to adjust to work with this space?
- How did community members adjust to work with this space?
- What worries you about this space and its use? Walk me through any examples.
- What pleases or interests you about this space and its use? Walk me through any examples.
- What are libraries for?
- How does this space align/not align with the library's mission or values?

For Library Personnel and Trustees

- How do you pay for this space?
- Did you move things to make room for the space?
- What programs or services changed to accommodate this space, if any?

Questions to Prompt Further

- What happened then?
- Could you give me a concrete example?
- What were your feelings then?
- Is that exactly right? (When I paraphrase)
- When that happened, what thoughts did you have?

If shrug, grimace, etc. say "You had some pretty definite feelings about it? What were they?"