

BUILDING COMMUNITY THROUGH COWORKING: A CASE STUDY OF SPATIAL  
FACTORS AFFECTING MEMBER SATISFACTION WITH COWORKSPACES AND  
COLLABORATIVE ACTIVITY

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## ABSTRACT

Coworking is a recent movement in workspaces, having developed as a formal working style around 2006. Coworking describes the act of sharing a physical workplace and office resources with other people who are not employees of the same company. It is an elective process, considered one of the many elements of the new sharing economy.

Because coworkspaces allow members with very different backgrounds to come together and work in close proximity, they represent nodes within a community that can increase the social network ties of members. An increase in social network ties is linked to an increase in an individual's social capital. Having many individuals with robust social capital connections helps to build the overall resilience of a community. For this reason, coworkspaces represent an important opportunity for improving social capital and resilience.

Many workplace studies examine the effects of worker satisfaction with setting on work activities, including collaboration and knowledge sharing. Because coworking is a relatively new phenomenon. Understanding the effects of spatial factors of the coworkspace on member satisfaction with the setting, and the collaborative activities that take place there, will lend new insight and allow for improvements on the design of coworkspaces.

This thesis examines four coworkspaces in a single community (Ithaca, NY). User experience was measured through a survey measure of satisfaction with spatial factors and collaborative activity. The survey findings were enriched through ethnographic observations and one-on-one user interviews, to develop a better understanding of what

elements in coworkspaces may lead to member satisfaction. Spatial factors investigated include openness, proximity to others, flexibility, privacy, distraction, and territoriality. Other factors emerged, during interviews, as meaningful to members, including artwork, presence of plants, daylight, and window views.

Despite having different square footages and different design, the four sites have notable similarities. All four are in historic buildings in downtown Ithaca, NY. High windows are present in all four buildings, as are elements of historic architecture. Work zones are also similar; each site has two meeting rooms, a large open work area, and an area for food storage. Sites varied primarily in their aesthetics and decoration, their specific location within Ithaca, their size, and the emphasis of their membership marketing.

Openness, variety of settings, and auditory distractions are found to be major spatial factors that contribute to changes in satisfaction with the collaborative environment in coworkspaces. The combination of one main open work area, two private workspaces, and options for workstation location and height contributed to member satisfaction with variety. Additionally, differences in satisfaction were apparent for staff members and based on gender, signifying that role and personal traits affect members' perception of the spaces and their experiences within.

## BIOGRAPHICAL SKETCH

Bonnie Sanborn was born and raised on San Juan Island in Washington State. She is a former Americorps service member and holds a BA in Anthropology (Minor: Dance) from California State University, Sacramento. She has worked as a graphic designer and archaeological technician for academic, private, and public organizations. Bonnie also studied Geographic Information Systems at American River College and has created several GIS maps and systems for various archaeological projects.

Bonnie's interest in collaborative work and space design stems from all these disparate elements in her background; investigating how people interact with one another and their physical environment, and how spaces are created, represented, and recreated through design, informs this (and other) projects.

Bonnie has appeared at conferences and on panels discussing her research on social capital, collaboration, and space design for work and education. Research about Rev: Ithaca Startup Works performed for this thesis won Best in Research Category at VentureWell's Open 2015 conference.

Dedicated to

Sara Jean Eaton

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## 1. INTRODUCTION

Workplace studies have long acknowledged the importance of the physical environment to workers. Improvements to the physical environment are seen as one route through which to influence employee satisfaction (Fairbrother & Warn, 2003; Laschinger, Finegan, Shamian, & Wilk, 2004), improve retention (Sarmiento, Laschinger, & Iwasiw, 2004), and even employee health outcomes (Heerwagen, Heubach, Montgomery, & Weimer, 1995). These effects are well-described in the literature, but have not often been applied to less traditional work settings. One type of work setting that is still poorly understood is coworkspace.

Coworkspace is a term used to describe the physical setting in which coworking takes place. Coworking describes both a physical configuration of workspace and a philosophy of sharing. The term was first used in 1999 by Bernie DeKoven to describe a style of co-located and equal, but autonomous, work made possible by advances in mobile technology (Deskmag.com, 2015) Brad Neuberg opened what is widely recognized as the first official coworkspace in San Francisco, Spiral Muse (Deskmag.com, 2015).

In a coworkspace, individuals and groups running separate businesses come together to share physical space, as well as beneficial office resources. This is economically efficient for freelancers and small businesses, because they do not need to pay the total cost of renting, furnishing, lighting, and heating a workspace, but they still get the advantages of having a professional office. Philosophically, coworking is embedded in the growing movement known as the sharing economy (Kenline, n.d.; Jackson, 2013). People seek out coworking because of the intangible benefits it offers –

such as collaborative activity, socializing, and sharing knowledge – as well as the more tangible economic benefits (Kenline, n.d.; Capdevila, 2013).

While there is not a large body of research on the social aspects of coworking spaces, several papers have been produced, most of them focusing on the well-established site of Indy Hall in Philadelphia, PA. Wetstein (2010) explored how a shared workspace can lead to increased leadership in a community of entrepreneurs, with Indy Hall's management acting as a partner in the project. Wetstein found that two types of leadership skills – individual and collaborative – were strengthened directly by sharing a physical workspace. Indy Hall was also one of the primary research sites for the Humantics study (Fraser & Witman, 2010), which examined the cognitive aspects of collaborative activity in coworking spaces.

In her multimedia thesis, *Making Space for Others*, Jackson (2013) investigated the socioeconomic factors that initiated a major movement toward coworking, and how coworking continues to persist even as the global economy repairs itself. Part of this economic recovery, Jackson argues, is due to increased social capital. This increase is due in part to the trust that is built by the sharing economy. Jackson sees coworking as a major aspect of this sharing economy, thus making coworking an important influence on social capital.

Kenline (n.d.) also sees space and the culture of coworking as intertwined. She conceives of the spaces as “ecosystems,” bounded externally by space and internally by the people working in the space. She calls for future research that looks more closely at which aspects of coworking culture can be intentionally created and replicated, both within

other coworking spaces and in non-coworking contexts. My study responds to this call by examining which aspects of coworking culture and space use are reproducible.

In addition to providing a new and interesting way for people to work in our increasingly mobile culture, coworkspaces also offer possible benefits to the communities in which they exist. Coworkers who come together in coworkspaces are enriching their personal social networks, and thus adding strength to the overall network of social capital in their community.

Since its beginnings in the early 2000's, coworking has seen exponential growth worldwide; more and more people are forming the opinion that this style of work suits them (Deskmag.com, 2015). As coworking becomes a more popular arrangement for workers around the world, it will be increasingly important to understand how to design and build effective coworkspaces. The benefits for both business and social capital are potentially quite large. This project aims to offer some initial insights into the spatial factors of coworkspaces that affect users' perceptions of collaboration within the space. I analyze how the physical design of coworkspaces is associated with new work experiences and new social network connections, which may lead to increased social capital for users and the community in which they live.

## 2. LITERATURE REVIEW

This review of existing literature outlines the work that has been done on spatial factors in the workplace and their effect on interaction, satisfaction, and collaboration. These factors include variety and flexibility, proximity to others, visual access, personalization/territoriality, and auditory privacy/distraction in the workplace. In addition to exploring existing literature on workspace physical features, this review also covers relevant literature on organization and social interaction of groups as it relates to the physical environment.

Uncovering the spatial factors in the physical environment that influence social interaction is instrumental to demonstrating that coworkspaces can assist in forming new social network ties for coworkers. The final section of this review includes relevant literature regarding social capital and social network ties within communities, showing that coworkspaces may serve as important nodes in these networks.

The physical environment is the setting in which all of our social interactions take place – no activity exists without the setting as its context. While Scott (1995) views space as containing possibilities for action, Weick (1979) sees space as containing “the raw materials” (p. 47) of behavior. These are the possibilities a space offers, both unintentionally and by design. Designers of space and products are encouraged to think about the affordances of their creations, so that they offer up the “possibilities” and “raw materials” that users will need in order to have successful interactions. Some environments are more conducive to fostering social interaction than others (Davis, 1984; Hatch, 1987; Zalesny & Farace, 1987). Facilitating informal social interactions in the workplace is known to be an important mechanism for encouraging transfer of knowledge

between workers (Whittaker, Frohlich, & Daly-Jones, 1994; Bouty, 2000) and improving their social capital (Tsai & Ghoshal, 1998; Oh, Chung, & Labianca, 2004). Very little research has been done on the role of the physical environment and discrete spatial factors in coworking settings, specifically.

## 2.1 Proximity

Being in close physical proximity to others with skills and knowledge to share is also beneficial to users (Boud & Middleton, 2003; Bunnell & Coe, 2001). Physical proximity is gaining more and more attention in workplace studies as a factor that leads to informal information exchanges between colleagues (Allen, 1970; Boud & Middleton, 2003; Bouty, 2000). Given that a large part of the appeal of coworking is socialization and sharing ideas with other members, coworkspaces should also take note of the power of physical proximity.

Allen's influential early work on knowledge workers showed that physical layout exerted an influence on their communication patterns. In his seminal 1970 article, Allen postulated that not only was communication important for coordination of work, and that the physical layout of the workspace could encourage or discourage communication. Close physical proximity is key to encouraging interaction (Allen, 1970).

Later work demonstrated that workers were much more likely to communicate with colleagues who were within a horizontal distance of 30 meters. Longer distances did not have a significant effect on communication

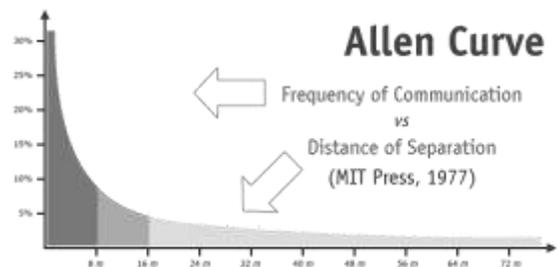


Figure 1: Allen Curve

likelihood, however. The study resulted in the widely-used graph (Figure 2.1) known as

the Allen Curve. This study clearly demonstrated that very close physical proximity increases the chances of communication, while further (>30 meter) distances had less of an effect. Linear arrangements that maximized the distance between workers were least effective for promoting communication, as were traditional office layouts that provided more powerful individuals with window offices along the periphery of the space (Allen & Fusfeld, 1975).

As Schein (2010) and others note, a person's nearness (adjacency or visual availability) to another person can influence whether or not they initiate an interaction. Additionally, the nearness with which they conduct that interaction (in terms of interpersonal space) can affect how each one perceives that interaction, as well as how it is perceived by outsiders. These issues are also important to coworkers, who often note that being around or near other people is appealing to them and leads to more conversations, both work-related and non-work related.

Vertical distance has a less straight-forward effect on communication interactions. In Allen and Fusfeld's 1975 study on horizontal communication patterns, the authors stated that future research should study whether or not vertical distances had an equal effect. They speculated that multiple flights of stairs would have an exponentially greater effect, as people became less and less willing to exert themselves physically.

Kraut, Egido, and Galegher (1988) further examined the relationship between horizontal and vertical proximity and collaboration between researchers. They found that close physical proximity – in this case, sharing neighboring offices or offices on the same floor – led to an increase in research collaboration and co-publication. Vertical distance was a major separation for researchers. The authors theorize that one benefit of proximity

for collaborative activity is the ability to easily talk about minor matters and small topics, which is facilitated by easy access to collaborators.

In every knowledge community, there are some actors who are more experienced or have greater access to information. Allen, and many other networking researchers, note that there is only a small percentage of any knowledge community that is both knowledgeable and approachable – making them “gatekeepers” (Allen, 1970, p. 15). Persons who are unknown to an actor are automatically unapproachable, according to Allen, as there is no way to know how a stranger will react to a request for help or a question that might seem stupid (Allen, 1970). It follows, logically, that those who are better known to an actor are more approachable, even in cases where the question makes the actor feel vulnerable.

Bagley and Shaffer (2012) attempt to ascertain whether or not physical co-location can affect the mentor-mentee relationship, as participants in this study seem to feel it can. They found that virtual interaction with mentors through an epistemic game (one specifically intended to facilitate mentorship conversations) did not necessarily reduce the quality of information exchanged between mentors and mentees. This type of game, however, is not commonly used to facilitate mentor-mentee relationships. More often, communication takes place through e-mail, video chat, or a phone call; this removes the support structure of Bagley and Shaffer’s game, which might lessen the quality of the interaction. Time with mentors in the game was also scheduled for students, meaning they did not have to make a choice about when or how to approach their mentor for help with an issue.

One of the main anecdotal reasons people seek out coworkspaces is to be in physical (and thus social) proximity to others. Capdevila (2013) views coworkspaces as communities of practice, or microclusters, and notes that spending a great deal of time in close proximity seems to lead coworking members to develop practices for coordination. Temporary partnerships between members may offer new learning opportunities. The same could be said of the arrival of new members to the space.

## 2.2 Openness

Open-plan offices were the norm in the late 1900's, when workers would sit at tables in a shared room and perform record-keeping tasks by hand. Office designs have moved from open rooms of tables, to secretarial pools surrounded by private offices, to cubicles with private offices. The trend now appears to be swinging back toward open-plan offices, especially for creative and tech-based fields (Saval, 2014).

As workplace design creates more open floorplans, workers and workplace researchers can see both benefits and drawbacks to an office that is primarily shared space. There is not yet a strict definition of what makes an office "open," but a high percentage of unobstructed space – often in the center of the workplace – is a key feature. The more unobstructed, shared space, the more open an office layout is considered (Hua, Loftness, Kraut, & Powell, 2010).

Open-plan offices are believed to foster social interaction, because they afford more opportunities to overhear or run into coworkers who are discussing productive or creative topics (Irving & Ayoko, 2014). It is unclear, however, which elements of an open floorplan contribute to improving interaction, and which elements may discourage interaction; Fayard and Weeks (2007) believe it is as much the physical affordances of

the space as the social affordances and culture of collaboration that an open floorplan signals to workers. Removing obstacles and visual barriers between employees also makes it easier for them to seek out other workers they need or want to interact with, and makes it easier to initiate face-to-face conversation (Allen, 1970; Allen & Fusfeld, 1975; Irving & Ayoko, 2014; Middlebrooks, Hayden, & Smith-Jackson, 2014).

Open-plan offices also meet with criticism. They are not suitable for every type of task – especially focused work – because they increase the amount of distraction that employees feel (Hedge, 1982; Hua, 2010a). Distractions experienced in open-plan offices include conversations from other workers, phones ringing and phone conversations, and movement of other workers (Irving & Ayoko, 2014; Hedge, 1982; Emberson, Lupyan, & Goldstein, 2010). Noise in the workplace has also been shown to increase stress and decrease productivity, which evidence contrary to the popular opinion that open-plan offices increase productivity (Evans & Johnson, 2000). Finally, open-plan offices do not allow workers to have as much privacy or personal space, and dealing with the increased social interaction that invariably results from this situation can cause stress, distractions, and even conflict (Middlebrooks, Hayden, & Smith-Jackson, 2014).

Given the pros and cons of open-office plans, some have asked whether or not they are ultimately beneficial. Researchers are still attempting to answer this question, but it appears that for some types of work and some tasks, the benefits outweigh the distractions. Open-plan offices can generate feelings of creativity and collaboration, leading workers to perceive that their workplace is more supportive of these activities (Hua, Loftness, Heerwagen, & Powell, 2010; Hua, Loftness, Kraut, & Powell, 2010; Fayard & Weeks, 2007). Morrow, McElroy, and Scheibe (2012) found that the act of

redesigning an office to include more open space can increase feelings of collaboration and organizational commitment, so much so that the benefits outweigh the distractions workers also experience. With this in mind, it is clear that more research is needed to determine whether the positive outcomes gained in an open office plan can outweigh the negative issues the openness causes.

### 2.3 Variety and Flexibility

Workplaces that seek to improve worker interaction and collaboration often achieve this by offering the right variety of physical settings within the workplace. Current literature supports the idea that providing a range of space types within one setting leads to user satisfaction and increased interaction (Agneessens & Wittek, 2012; Jamieson, Fisher, Gilding, Taylor, & Trefitt, 2000). This allows users to find appropriate settings to support the types of activity in which they want to engage, from a private meeting to an all-inclusive brainstorming session.

Schein (2010) looks at the interaction between space, time, and action. He divides time into monochronic and polychronic, with each one requiring a different spatial support. Coworking spaces are highly polychronic, with many different activities happening concurrently – often at all hours of the day. Spaces in which polychronic activity takes place require multiple, flexible areas that users can easily adapt to their current needs. This is consistent with current literature on interaction spaces, such as Peter Jamieson's work on highly flexible rooms in university settings (Jamieson, 2003).

It is acknowledged that flexibility is good, and that members need some access to different types of spaces. One of the challenges of welcoming a new member to a coworkspace -- especially if it is the member's first experience with coworking -- is that

they may not know how to use the variety and flexibility to their advantage (Fraser & Witman, 2010). Some may even feel that they shouldn't alter the space (Jackson, 2013). Gaining a better understanding of how to support new members and train them to use a coworkspace would benefit owners and operators.

#### 2.4 Auditory Privacy and Distractions

Traditional companies and coworkspaces alike value openness in the floor plan, as it leads to easier communication and more informal interaction between workers. Privacy in the workplace is an especially important issue when the space is more physically open. Coworkspaces house companies and individuals with different business interests, so privacy can be important for conducting transactions away from other members.

Two types of privacy come into play in an open floor plan: visual and acoustic. With the recent rise in popularity of open-plan offices, so, too, has there been an increase in evidence that open-plan offices have drawbacks. Kim and de Dear's (2013) recent work suggests that there are important tradeoffs between communication and performance in open-plan settings. However, research suggests that workers in more open layouts are willing to accept the tradeoffs of decreased visual and acoustic privacy, as long as they are psychologically prepared for the setting and see benefits to the layout (Lee Y. , 2010).

One of the main sources of acoustic disturbances in workplaces is phone calls, both in terms of ringing and in terms of conversations (Banbury & Berry, 2005). Emberson et al (2010) term these fragmentary conversations "halfalogues," and theorize that they are more distracting, not because listeners are tempted to try to fill in the missing half of the conversation but because hearing only half a conversation is inherently less

predictable than other forms of speech. Not knowing when the speaker is going to continue causes the most distraction, as do other forms of intermittent and unpredictable noise, such as airplanes and traffic sounds (Crook & Langdon, 1974; Eberhardt, Stråle, & Berlin, 1987).

Regardless of workers' self-reported satisfaction, there are real ramifications to auditory distractions in the workplace. Tasks that require focused attention are more difficult when there is intermittent background noise, which is common in open plan offices such as those found in coworkspaces (Jahncke, Hygge, Halin, Green, & Dimberg, 2011). An additional challenge in coworkspaces is that each member or member company has its own needs for communication at varying times throughout the day. To deal with these challenges, coworkspaces have tried various interventions – typically policies, not design features – such as asking members to limit phone time while in the space (WeWork, 2015).

### 2.5 Personalization and Territoriality

Brown (2009) views personal expression (or identity-oriented marking) as one aspect of territoriality. Any space that a person uses on a regular basis can begin to take on territorial aspects for that person. Users may set physical boundaries around the space (control-oriented marking) by leaving clothing or moving furniture. They may also engaged in identity-oriented marking by personalizing a space with items, photographs, or preferred mugs (Brown, 2009). These items serve not only to mark territory, but also to express the user's personality; this becomes increasingly important when users feel less individualized in the workplace (Zeisel, 2006). Workers also use territorial marker

items as shared points of contact, to spark conversations or bridge social gaps (Irving & Ayoko, 2014).

Altman's (1975) work on territoriality and self-regulation indicates that people need at least some measure of territoriality to feel in control of both their space and themselves. Recent studies suggest that gender may play a role in how and why people personalize a space, with women tending to engage in more identity-oriented marking and men engaging in more control-oriented marking (Dinç, 2009; Wells, 2000). Personalization is also an expression of how a person views their relationship with the larger group. One factor that may emerge more frequently at coworking sites than traditional offices is personalization as an expression of collective identity (Hartjes-Gosselink, 2009).

Many traditional workplaces are changing their office layouts to hot-desking or just-in-time style, in an attempt to increase collaboration and informal interaction between coworkers (Millward, Haslam, & Postmes, 2007; Bennett, Owers, Pitt, & Tucker, 2010). Attempts to increase collaboration by decreasing territoriality should be made with caution, as users may react negatively to loss of territory. Territorial behavior and personalization of a workstation may set boundaries around a user, which leads others to view them as unapproachable and limits opportunities for collaboration (Brown, 2009).

Personalization and territoriality have been well-researched in traditional workplaces, but there is less work on how personalization is used to mark territory in offices that are ostensibly non-territorial. Coworkspaces offer this interesting tension between territoriality and personal expression. Members can choose their coworkspace, as well as their own working hours, attire, and break times. But coworkspaces often do not offer as much territory or personal expression as an assigned desk in a traditional

office. Members must take most of their belongings with them, or put them in storage, at the end of the day, leaving them with fewer opportunities to make their mark (Hartjes-Gosselink, 2009; Pitt & Bennett, 2008).

## 2.6 Social Capital

Methods are still being developed for the measurement of social capital, but community participation is acknowledged as one major building block of social capital (Onyx & Bullen, 2000). Physical co-location and organizational coordination both have the potential to increase social capital between individuals. As individuals come into repeated contact with one another and work towards common goals, network ties strengthen. These stronger, persistent ties facilitate future coordination in times of community need or crisis (Pretty, 2003; Pelling & High, 2005). Social capital has been linked to effective management of a community's environmental resources, as well as health outcomes, economic benefits, and resilience to disaster (Kawachi, Kim, Coutts, & Subramanian, 2004; Hawkins & Maurer, 2010).

Most theorists categorize social capital into three types: bonding, bridging, and linking. Bonding refers to ties between people with similar experiences and backgrounds. Bridging refers to ties between people or groups with different traits, skills, and/or experiences. Linking refers to vertical power associations between actors at different levels of the same community. In terms of building resilience, bridging ties are the most robust and beneficial to both individuals and their communities (Kawachi, Kim, Coutts, & Subramanian, 2004; Putnam, 1995)

McPherson (2004) conceives of a person's possible social network connections as falling into a multidimensional unit, which he terms Blau space. Just as an increase in

physical distance can decrease the likelihood of social interaction between two people, so does an increase in Blau space – as calculated by the number of characteristics, or nodes, that the people have in common. Nodes can include age, gender, and workplace – in this case, coworkspace. Neutens et al (2013) extend this concept by viewing Blau space and personal nodes as representing potential connections, and they theorize that even the potential for new network ties can build social capital, given the correct preconditions.

Following Allen and Fusfeld's (1975) work, more recent research has found strong links between spatial closeness, collaboration, information sharing, and social network ties in a variety of settings (Sailer, 2007; Wineman, Kabo, & Davis, 2009; Conti & Doreian, 2010). Coworkspaces, anecdotally, are hotbeds of collaboration for exactly these reasons: they allow workers with a variety of skills and experiences to develop these new close network ties through spatial and visual proximity. When these ties form, they increase the social capital of individuals, as well as the community as a whole.

Because they are spaces in which a wide variety of individuals come together to share workspace and resources, coworkspaces offer high potential for forming all three types of ties needed for a strong network of social capital (Capdevila, 2013). Members who might never otherwise meet come together in the space and, through the combined effect of working in close physical proximity and sharing similar goals and values (regarding membership in the space, at minimum), form a new node in the social network of the community. This, in turn, increases their points of contact within Blau space and increases the potential activity in their network for both themselves and their associated network ties.

### 3. RESEARCH STATEMENT

By examining the connections between space, social interaction, and organizational coordination in coworkspace, this study aims to show that the physical features of coworkspaces affect member satisfaction, social interaction, and collaboration, thereby building social capital for both individuals and communities. For a coworkspace to serve as a community node, it must attract and retain members who can engage in varying levels of social interaction with one another. Physical elements of the space that may support such interactions include the variety and flexibility of the space, openness, access to other members, distractions, and a sense of territoriality in the workspace. If members experience a supportive environment and collaboration within the coworkspace, they will strengthen their social ties within the space and – by extension – with their coworkers' network connections, too. This study examines such spatial factors in four coworkspaces in Ithaca, NY to determine how they influence collaborative interactions that may build social capital.

First, I deductively examine the effect of spatial factors on social interaction and collaboration. I hypothesize that there will be a difference in satisfaction with variety and perceived support for collaborative activities based on differences in spatial factors in the four coworkspaces.

- H0: There is no difference in satisfaction with variety and perception of support for collaboration across site.
- H1: There is a difference in satisfaction with variety and perception of support for collaboration across site.

Second, I inductively examine the mechanisms underlying this hypothesis. Through the use of interviews and observations, combined with relevant literature, I explore how and why spatial factors such as openness, auditory distraction, and territoriality may influence social interaction and collaboration. Taken together, the deductive and inductive parts of the study complement one another to provide new insight into how spatial factors influence coworking members' satisfaction with their workspace and the collaborative activities they perform within it.

#### 4. METHODOLOGY

##### 4.1 Research Sites

To examine the effects of spatial factors on coworking members' satisfaction, social interactions, and collaboration, I conducted a cross-sectional comparison of four coworkspaces located in Ithaca, NY: CoLab Hive, Rev: Ithaca Startup Works, STREAM Collaborative, and Studio West. All four sites are located in the downtown area of Ithaca – three on the pedestrian business area known as the Ithaca Commons and one several blocks west of the Commons.

### 4.1.1 CoLab Hive

CoLab Hive (Illustration 4.1) is a cooperatively run coworking space, founded in 2011 by Ralph Cutler and Rylan Peery. CoLab is housed on the second floor of a historic building on the Ithaca Commons and comprises 628 square feet of space in three rooms. It focuses on serving technology related freelancers and social entrepreneurs. While the space functions like a coworking site, with some non-territorial desks, there are also designated work spaces and operates as headquarters for a web design and development agency.



*Illustration 4.1: CoLab Hive*

Decisions within the Hive space are made through the CoLab committee. All members are invited to participate in the committee. Non-committee members are encouraged to participate in the decisions about the space as well. CoLab Hive is currently moving forward on a renovation of the space and expansion onto the floor above to foster its ethos of collaboration and increase capacity. CoLab is also exploring creating coworking spaces in other countries where the agency has presence to further foster the collaboration spirit.

Members at CoLab Hive are primarily software developers. The company, CoLab Cooperative, works on technology solutions including website and app development. Most members don't require anything more than a computer in order to complete their work, and members of CoLab Cooperative frequently work from remote locations.

#### 4.1.2 Rev: Ithaca Startup Works

Rev: Ithaca Startup Works (Illustration 4.2) is a joint project between Cornell University, Ithaca College, and Tompkins Cortland Community College, which opened in August 2014. It is a StartUp NY site for new businesses, and a part of the Southern Tier Startup Alliance.



*Illustration 4.2: Rev: Ithaca Startup Works*

Members are Rev are individual business owners or small start-up companies, all of whom are progressing through Rev's business incubator program. Rev provides resources and programming for startups in the region. Admission to the Incubator is open to any new company in the area, regardless of affiliation with any of the three schools. When members meet established criteria for success with their business, they will "graduate" from the Incubator and move to a different space more suitable to the needs of a growing business.

Rev is housed in a renovated historical building adjacent to the Commons in Ithaca downtown. The Carey Building, originally built to house a fire insurance agency, is a well-known landmark in Ithaca. Rev occupies the second floor (4500 square feet) and will also occupy the third floor (4000 square feet) when an add-on is completed in 2015/2016. The second floor space has an open floorplan, a prototyping workshop, and two meeting rooms – one conference room and one breakout room. Nearby neighbors include retail

shops on the first floor of the Carey Building and restaurants located on the same block; in the future, upper stories of the Carey Building will include 20 apartments.

The prototyping workshop (Illustration 4.3) is a major component of Rev's programming. Although it is not a full, exploratory Makerspace, it does house similar equipment. The workshop offers members the ability to quickly prototype physical product or component ideas in a cost-effective



*Illustration 4.3: Rev's prototyping workshop*

manner. Some companies use the workshop frequently, while others – who are focused on non-physical or food products – rarely use it. In the near future, the workshop will be the host to a hardware accelerator summer program.

#### 4.1.3 Stream Collaborative

Stream Collaborative (Illustration 4.4, 4.5) was created in 2012 by Noah and Jennifer Demarest, and moved into its current space in 2013. Noah's intention was to include coworking space alongside his own business, to help support a larger studio space. Members in the space



*Illustration 4.4: STREAM Collaborative, main work room*

have been fairly stable since the opening of STREAM, and they frequently work with one

another or hire each other on projects. STREAM Collaborative consists of five rooms – one private office, one break room, two main rooms with designated workstations for six members, and a meeting room -- for a total of 900 square feet. The space takes up the second floor of a building on the outer edge of the Ithaca Commons.



*Illustration 4.5: STREAM Collaborative, second work room*

Stream's members are mostly associated with the architecture and urban planning industry, in some way. Member businesses include urban planning, storm-water engineering, architecture, landscape architecture, graphic design, and illustration. This was a conscious choice on the part of the Demarests, who wanted to foster an atmosphere of collaboration and include members that they might want to work with in their own business. Several members at STREAM joined the coworkspace after working with the Demarests, or another member, on a project.

#### 4.1.4 Studio West

Studio West (Illustration 4.6, 4.7) was founded in 2012 by Greg Kops. Kops originally wanted to create a work space for his marketing and social media business. He knew a landlord who wanted to rent out a three-story, 1500 square-foot building. Kops agreed to rent two floors of space, which was



*Illustration 4.6: Studio West, main entrance*

larger than his company of three needed, and chose to create a workplace that a community of workers to share the space and cost. Part of the inspiration was visiting coworking spaces in New York City and generating ideas about what was possible in Ithaca.

Studio West is a traditional coworking space, in that members can rent desk space by the hour. Members do not have designated work spaces; one member has a dedicated walking desk (Illustration 4.8) that she has arranged to use. Nearby neighbors include a popular Ithaca café and several restaurants.



*Illustration 4.7: Studio West, open work room*

Members at Studio West have a range of businesses, from landscape design to college admissions counselling to working for Think Topography, Kops' current digital media company. The members also frequently come together for social and networking events in the space, and Studio West is one of the gallery sites participating in Ithaca's First Friday Gallery Night. Kops wanted the space to support local art and music, and this is reflected in the types of events he organizes.



Illustration 4.8: Studio West, standing treadmill desk

#### 4.2 Research Design

Research design is shown in Table 4.1. The research method for this project was a combination of two complementary

Space Name	Survey A	Intervention	Survey B
Studio West	✓	No: existing users	✓
CoLab Hive	✓	No: existing users	✓
STREAM Collaborative	✓	Yes: room added	✓
Rev: Ithaca Startup Works	✓	Yes: new space	✓

Table 4.1: Research Design

styles: Post-occupancy evaluation and ethnography. These methods were chosen to allow the investigator to examine user satisfaction in the style of a typical Post-Occupancy Evaluation, but also to enrich that understanding with first-hand user accounts over a longer period of time. Because coworkspace spatial factors have not yet been clearly linked to collaborative and social outcomes, this method provides a rich, qualitative foundation for future studies to develop and test hypotheses about specific relationships.

Surveys were administered to at each site at two points in time, approximately six months apart. One-on-one interviews were conducted and observations of group interactions took place over the course of the assessment. By using this mixed-methods approach, this study examines coworkspaces through validated quantitative measures, enhanced by qualitative data that can lend new insights into this relatively small body of knowledge.

Participants took Survey A in October 2014. They participated in one short interview, to collect information

Space Name	Oct 2014	Oct 2014-Jan2015	Feb 2015
Studio West	Survey A	Observation/Interviews	Survey B
CoLab Hive	Survey A	Observation/Interviews	Survey B
STREAM Collaborative	Survey A	Observation/Interviews	Survey B
Rev: Ithaca Startup Works	Survey A	Observation/Interviews	Survey B

*Table 4.2: Project timeline*

about their previous work experiences and goals for using the space. In February 2015, participants took Survey B, and responses were compared from Time A to Time B to determine whether or not scores were stable over time. Throughout the study period, the author took part in participant observations in each workspace, including typical work days, conversations with members, and special events. Project timeline is shown in Table x.x.

### 4.3 Spatial Factors

Attitudes and perceptions about space are related to how well that space supports a user's needs. Key design attributes of physical settings and factors of work environments that may support or impede users' activities were measured through visual observation and analysis of floor plans.

- Openness: The percentage of the total floor space that is visually open, with no formal walls and few barriers.
- Variety of Settings: The distinct physical spaces that users can choose to occupy. These settings were counted during observation; settings which duplicate each other were counted only once (e.g. two conference rooms with roughly the same features would count as one type of setting, a conference room).
- Flexibility: The degree to which users can easily alter their workspace by adjusting furniture, moving furniture, and adding or removing barriers. This was categorized as low (most furniture cannot be moved, aside from chairs and small objects), medium (approximately half of the furnishings can be moved easily around the space), or high (most furniture has wheels and/or is lightweight and mobile).
- Territoriality: If a user can come in to a space and sit at any desk, without feeling they are taking “someone’s” chair, the space is considered non-territorial. If, however, a user arriving to find someone at “their” desk would feel confused or frustrated, that is considered “territorial.” Users may develop territorial feelings for locations, even if the space itself is non-territorial. This was measured as a binary yes/no factor.
- Access to Private Rooms: If users have the ability to use a private room with a closing door, either by reserving it or on an as-needed basis, the space is considered to have access to private rooms. This was measured as a binary yes/no factor, and the number of private rooms was noted.

#### 4.4 Social Capital

Social capital is the network of social ties an individual has, signifying the resources and opportunities that individual has access to, as well as the individual's attitudes towards others. Social capital is believed to be generated by creating new social links, and then strengthening those links through shared activities and goals (Hawkins & Maurer, 2010; Kawachi, Kim, Coutts, & Subramanian, 2004; Onyx & Bullen, 2000; Putnam, 1995). Because it is difficult to measure social capital directly, researchers frequently use a proxy. For this study, the proxy measures are collaborative activity and user attitude, based on previous research that has shown participation in community events to be indicative of building social capital (Onyx & Bullen, 2000; Oh, Chung, & Labianca, 2004; Tsai & Ghoshal, 1998).

Collaborative activity within a coworkspace refers to pairs or groups of users coming together to accomplish tasks. When this occurs between users who did not previously know one another, it will introduce them and give them a shared activity on which to work. Meeting and sharing goals build a bridging connection between the people involved in the collaborative activity (Putnam, 1995; Kawachi, Kim, Coutts, & Subramanian, 2004). This makes collaborative activity an effective proxy measure for social capital.

In this study, information about collaborative activity was obtained through one-on-one interviews and observations within the coworkspaces. When users moved around the space to work together, it was coded as possible collaboration. Participants were asked about their different collaborative activities during interviews: whether or not they sought advice or opinions from others in the space, whether they gave advice or support,

and how often they partnered with other members (outside of their own business) to work on projects.

A sense of friendship and trust is also indicative of social capital (Putnam, 1995; Narayan & Cassidy, 2001). These can be inferred from the way in which a member conducts their daily routine, and how they express their feelings about the hierarchy and culture within the workspace. Sense of trust is an effective proxy measure for social capital, because social capital relies on building trust among participants in a network; a change in attitude toward a more trusting view of one's fellow members would signal an increase in a user's social capital.

During interviews, participants were asked about their social activities with other members. They were asked about both minor social interactions -- such as seeing another member outside the space or attending a work-related event together -- and also about friendships they had formed within the space. Based on research showing that some topics of conversation indicate strong network ties, participants were asked what types of things they discussed with other members: work only, family life, or other matters (Bearman & Parigi, 2004).

#### 4.5 Satisfaction with Workspace Variety

Hua's Workplace Collaboration survey (Hua, 2010a; Hua, Loftness, Heerwagen, & Powell, 2010; Hua, Loftness, Kraut, & Powell, 2010) was used, because it is a validated measure for satisfaction with the variety of spatial factors in traditional offices. The survey measures satisfaction with the variety of work settings in a space, as well as a respondent's perception of the support for collaborative activity that the space provides. Elements such as a moderate degree of openness, a low amount of auditory distraction,

availability of private meeting or work areas, and consolidated amenities like food and printer stations all contribute to a sense of support for collaborative work. This survey is applicable to coworkspaces because these features are often found in similar arrangements, but prior to my study, the survey had not yet been applied to coworkspaces. Before the survey was administered, it was modified (with the approval of the original author) so the language would accurately reflect a coworkspace setting.

#### 4.6 Interviews

Both members and staff of the four coworkspaces were interviewed for this project. The goal of the interviews was to collect qualitative data regarding participants' perceptions of the coworkspace itself, as well as their experiences with social interaction and collaboration. In addition to these main topics, I also asked about their familiarity with coworking and previous work settings. This was done to determine how if at all history and training might effect a member's perception of the coworkspace. The interview guide can be found in Appendix B.

#### 4.7 Observations

Ethnographic observations were conducted at the four sites over a period of six months. I participated in the coworkspace by taking up a seat as a member would, working on projects while observing other members. The investigator also attended meetings, open houses, and other events at each space. This resulted in a total of four hours of direct observation for each site, along with approximately 30 hours of participant observation, total.

During observations, it was noted when and how members interacted with one another, as well as how they used the space to support their activities. When

conversations could be overheard, their content was noted. The investigator also participated in discussions of the space during meetings and events.

## 5. RESULTS

### 5.1 Demographic Data

Out of 49 members and at the four coworkspaces, 32 (female = 7) consented to participant in this study (Figure 5.1). Participants were given the option to identify their role as primarily staff, primarily a member, or a member of a cooperative (Figure 5.2). Age was collected as a categorical variable (Figure 5.3). Tenure at the coworkspace was collected as a continuous variable in measured in months (Figure 5.4).

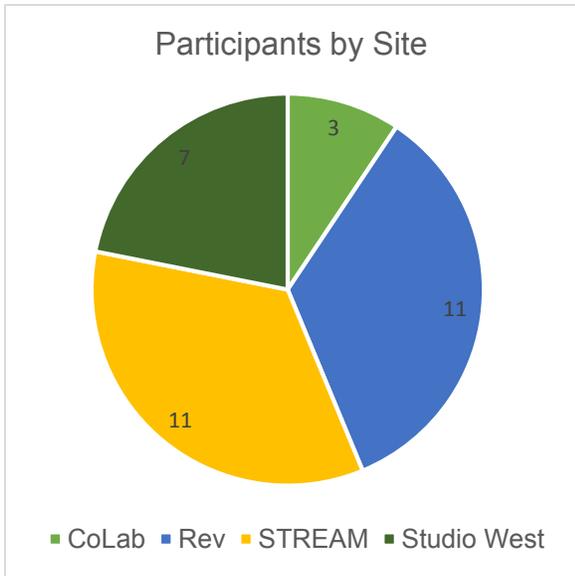


Figure 5.1

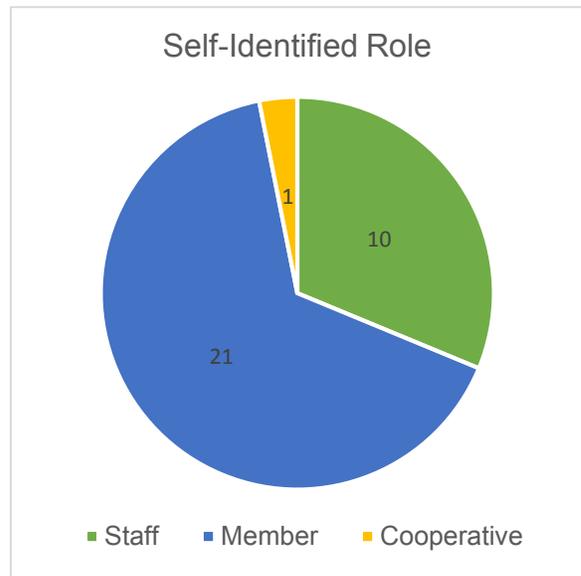


Figure 5.2

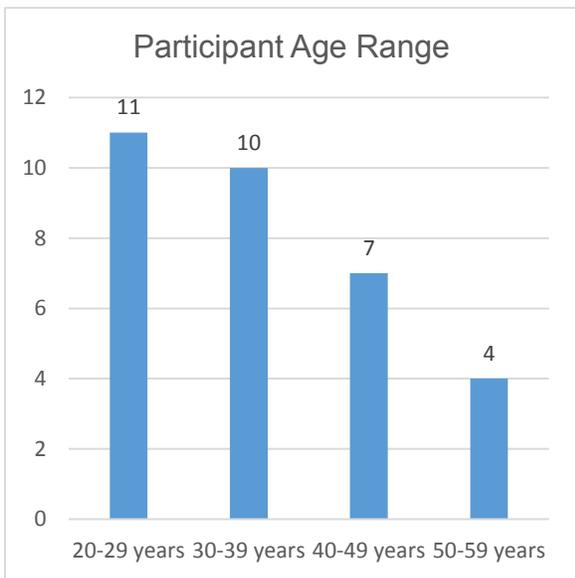


Figure 5.3

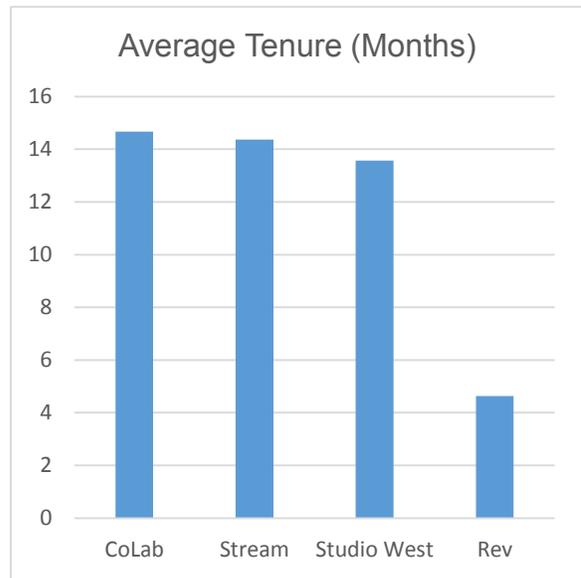


Figure 5.4

## 5.2 Coworkspace Spatial Factors

The four sites included in this study have varying degrees of visual and acoustic openness, as well as access to various amenities. Each site also contains spaces with varying levels of flexibility of configuration, from static (e.g. a conference room with a heavy table and matching chairs) to extremely dynamic (e.g. lightweight chairs and tables on casters, with movable whiteboard partitions). These different factors are summarized in Table 5.1.

	CoLab Hive	Rev: Ithaca Startup Works	Stream Collaborative	Studio West
<b>Openness</b>	46%	73%	54%	45%
<b>Variety</b>	3	7	4	4
<b>Flexibility</b>	Medium	High	Low	Medium
<b>Territoriality</b>	Yes*	No	Yes	No
<b>Private Rooms</b>	Yes	Yes	Yes	Yes

*\*CoLab Hive does not have assigned desks, but the coworkspace has a de facto territorial arrangement in which members almost always return to the same desks (see "Personalization and Territoriality" below).*

Table 5.1: Coworkspace Spatial Factors

The buildings in which each of the coworkspaces in this study are housed are all similar in their style and architectural features. Three out of the four are historic buildings on the Ithaca pedestrian commons. All four spaces are fortunate to have high ceilings and large, high windows. Each one also faces certain challenges due to the age and history of the building, including lack of elevator access and issues with heating and cooling.

Plants can be found in all four coworkspaces, and many people mentioned that they enjoyed having them around. Nowhere was this more prevalent than at Studio West, where the plants are a dramatic feature of the main entryway. Because the upper and

lower floors at Studio West are on a split level, members see the sunlight from the entryway through a curtain of green leaves. Most participants stated in interviews that they intentionally positioned themselves to be able to see this view, especially on a sunny day. Studies on Attention Restoration Theory indicate that patterns of leafy foliage may be soothing and help viewers restore their focused attention reserves (Kaplan, 1995; Berman, Jonides, & Kaplan, 2008).

Art is a common feature at Studio West and CoLab Hive, both of which pride themselves on displaying local art. Workstations at both spaces also face the walls, unlike those at STREAM and Rev, which face the center of the room or a window.

In the sub-sections that follow, I describe the spatial features of each site in more detail.

### 5.2.1 CoLab Hive

Though the CoLab space is relatively small, it is colorful – with a yellow and white theme - and well-lit by high windows. Its position over the Commons allows for pleasant views of other historic buildings in the area. Neighbors in the building include a yoga studio, a holistic healing office, and a café on the first floor.

CoLab describes itself as an exemplar of the coworking movement, “dedicated... to the values of collaboration, openness, community, accessibility, and sustainability in the workplace” (CoLab Hive, 2015). The interior of CoLab reflects the cooperative, “do-it-yourself” attitude with which the group aligns itself. The furniture is hand-built or purchased from local second-hand stores. The countertop desks installed around the periphery of the room were built by a member, as were some of the standing workstations. The art on the walls is bold and geometric, like the CoLab logo, and was created for the

space by a local artist. The other décor includes some plants, crystals, a desktop “Zen garden,” and musical instruments. Signs around the space are hand-lettered and carefully drawn with colored pencils (Illustration 5.1).



Illustration 5.1: CoLab Hive entry

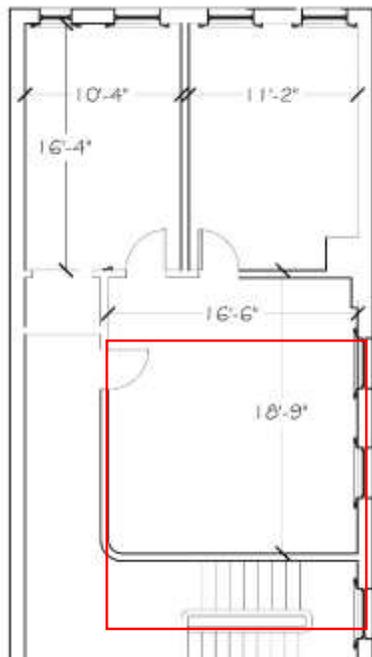


Figure 5.5: CoLab Hive Floorplan

- Openness: Out of a total of 624 square feet, approximately 288 square feet (46%) of CoLab is devoted to open work space (Figure 5.5).
- Variety of Settings: CoLab offers a medium variety of settings. The space contains a main open room with a table for seated work, a counter for seated or standing work, and a small shared library shelf. Private spaces comprise two small conference rooms.
- Flexibility: CoLab has a low level of flexibility. The seated work table in the main room can be moved, but the

low square footage means there are few options for placing it. Tables in the conference room can also be reconfigured.

- Territoriality: CoLab is semi-territorial. There are no specific policies assigning desks to members, but members tend to leave “their desk” set up at the end of each day. This means they frequently return to the same spot to work.

- Access to Private Rooms: CoLab has two small conference rooms that can be used on the spot (if empty) or scheduled for meetings.

### 5.2.2 Rev: Ithaca Startup Works

This business incubator is designed to be non-territorial and includes several casual lounge areas that can also be used for presentations. For larger classes and formal presentations, the entire open area can be converted into audience seating. Rev has held many events and classes since it opened, demonstrating the flexibility of the space.

The interior design of Rev was intended to be high-energy and industrial, preserving some of the original architectural elements of the building. The floors and ceiling are exposed concrete, treated with acoustic-dampening materials where appropriate. The color scheme for walls and furniture is primary orange, dark teal, charcoal gray, and warm wood tones. Local elements have been brought in, in the form of custom-built wooden lockers, hanging “sound clouds,” and a custom wooden conference table, all created by local woodworkers. Other furniture was sourced from Herman-Miller and strives for a modern, no-frills appearance.

- Openness: Out of 4,027 square feet, 2,941 square feet (73%) of Rev are devoted to the main open work area (Figure 5.6).

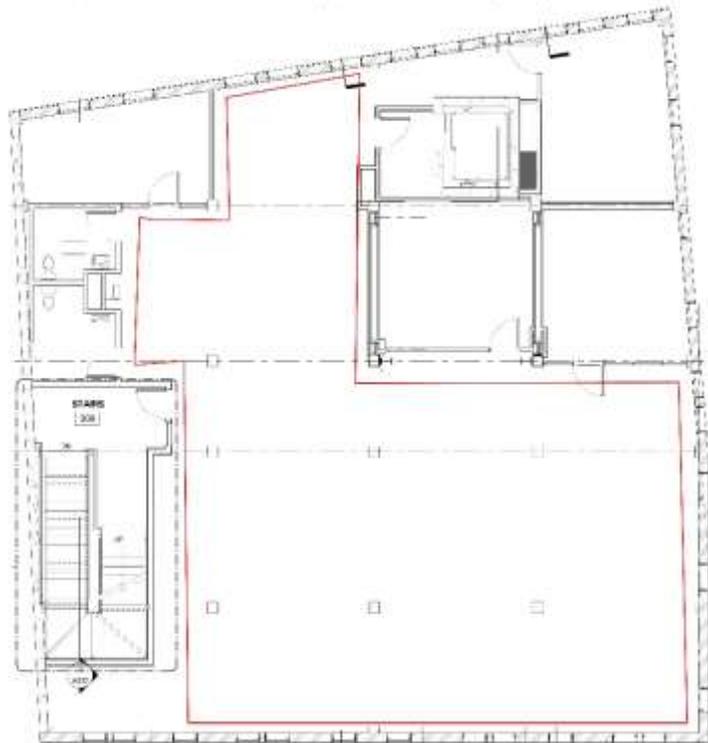


Figure 5.6: Rev Floorplan

- Variety of Settings: Rev contains a wide variety of areas at which members can work. There are two banks of main tables, which seat approximately 30 users comfortably. Two

lounge areas with sofas offer soft furniture with coffee-table height work surfaces. Two high-top tables let members choose between stool seating and standing work positions. There is also an area behind a soft acoustic sound barrier, shaped like a diner booth that offers semi-private space.

- Rev has a prototyping workshop, containing equipment such as a 3D printer, laser cutter, and drill press. There are also two private rooms: a small breakout room (open during the course of this study) and a formal conference room (not open during the course of this study). Finally, there is a private office used primarily by the incubator coordinator.
- Flexibility: Rev is very flexible, and most furniture in the space has wheels and/or folds up. The two main banks of tables can be rearranged or removed, and all of

the main workstation chairs are on casters. The soft acoustic booth can be turned around fairly easily, as it is lightweight. The soft lounge areas are less flexible. Members also have access to four rolling whiteboards, which are frequently moved around the space.

- Territoriality: Rev is non-territorial, though users often have a few preferred work locations.
- Access to Private Rooms: Rev had one private space (a small breakout room) open during the course of this study.

### 5.2.3 Stream Collaborative

The interior of STREAM is cool, calm, and professional. The color palette is predominantly gray and white, and the floor has been covered with series of layers of brown paper bags; the floor was a project that early members participated in creating. Décor tends to be in the form of project illustrations and schematics, which members pin up on tack boards that run around approximately half of the workspaces. There is also a blackboard wall in the conference room that members often draw or leave messages on. Some small plants are placed around the space, and a great deal of light comes in through high windows on all the exterior walls. STREAM shares a wall with the building that houses City Hall, and nearby neighbors include the Tompkins County Public Library, restaurants, and retail shops on the Commons.

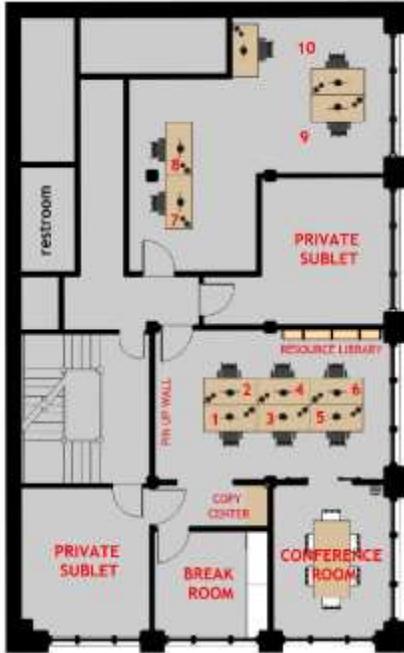


Figure 5.7: Stream Floorplan

- Openness: Stream has a total of 1,421 square feet, with two open work rooms totaling 772 square feet, or 54% (Figure 5.7).
- Variety of Settings: Stream offers a medium variety of settings. The space has two main open rooms with a desks for seated work, a shared printer area, and a large library shelf. Private spaces include one large conference room and a small breakout room. There are also two private offices associated with Stream; one is reached by entering a door between the two main doors of Stream, while the other is reached by walking through one of the main workspaces.
- Flexibility: Stream has a low degree of flexibility. Most of the furniture is large and stays in one place, moving only rarely when the operators want to reconfigure the space in a major way.
- Territoriality: Stream is territorial, and members select a desk as a part of their membership contract. Members who are in the space only part-time often share desks with other part-time members.
- Access to Private Rooms: There are two rooms available to members of Stream for private work or meetings, as well as two offices that are used privately by members associated with Stream Collaborative.

## 5.2.4 Studio West

Studio West is very bright inside, owing to the large, south-facing bay window across the front of the building.

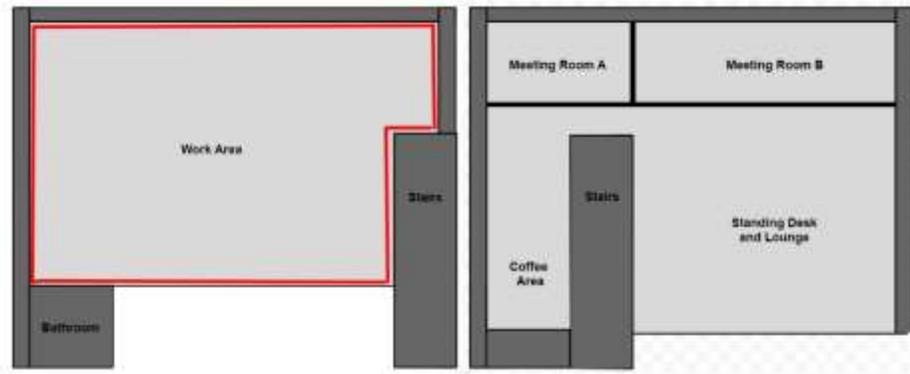


Figure 5.8: Studio West Floorplan

There is a small

landing directly inside the entry, on which members display their marketing collateral. The stairwell is filled with philodendrons and bamboo in planters. One or two members store their bicycles in the stairwell space during the workday. Stairs on the right lead up to the main open work area, which is painted a sunny yellow (chosen by Kops to counteract the gray of Ithaca's winters) and has rotating art displays. To the left, stairs lead down to the two private meeting rooms, the kitchenette, and the walking treadmill desk.

- **Openness:** Studio West has a total of 1,195 square feet, with one open work room totaling 535 square feet, or 45% of the floorplan (Figure 5.8).
- **Variety of Settings:** Studio West offers a medium variety of settings. The Studio takes up two floors of a building, with a stairway landing serving as the entrance. The lower floor has two conference rooms (one large and one small), as well as a walking treadmill desk, a couch area, and a kitchenette. The upper floor is open, with desks for seated work, a couch, and a small water cooler area.
- **Flexibility:** Studio West has a moderate amount of flexibility. The arrangement of the lower floor is not changeable, due to the small rooms and large, heavy furniture.

The desks on the upper floor are lightweight and easily moved, however, and they are reconfigured from time to time.

- Territoriality: Studio West is non-territorial, with the exception of the walking treadmill desk. This desk is owned by a specific member, and it is configured for her size and work preferences.
- Access to Private Rooms: Studio West has two private rooms: a small conference room and a large conference room.

### 5.3 Satisfaction with Coworkspace

Using Hua's (2010) collaborative workspace survey, participants indicated their satisfaction with the variety of the coworkspace, their sense of distraction (reverse coded), and their perception of the support for collaborative activity provided by the space on a 5 point Likert scale, with the highest possible score (indicating the most satisfaction) being 5.

Participants' individual scores from Survey A and Survey B were compared, to understand if opinions remained stable at the three existing sites (CoLab, Stream, and Studio West), and to see if participants experienced significant changes at the newly opened site (Rev: Ithaca Startup Works). In addition, participants' total scores for Satisfaction with Spatial Factors and Satisfaction with Collaboration were compared within and between sites to test the hypotheses of this study. Results were analyzed using UNIANOVA test, with site, gender, role, and age range as fixed variables.

Participants' scores for both Satisfaction with Spatial Factors and Satisfaction with Collaboration remained roughly constant across the study period. When satisfaction scores did differ, they were along specific parameters, as discussed below.

### 5.3.1 Satisfaction with Spatial Factors

Items 1 through 21 on the survey measured participants' satisfaction with the range of settings offered to them within their coworkspace. All sites had high ( $\bar{x} > 2.5$ ) satisfaction scores for spatial factors (Figure 5.9). Scores were stable over the study period, with no significant changes by site.

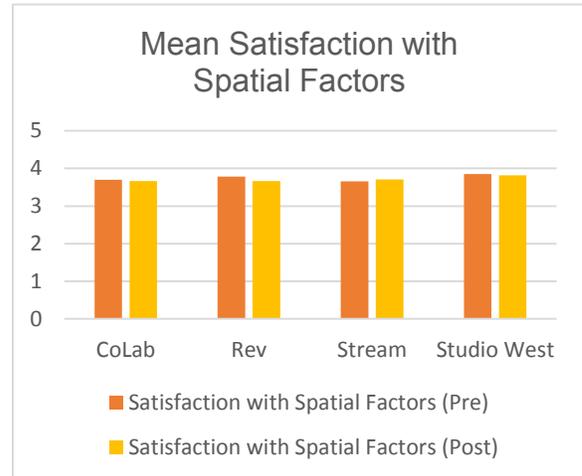


Figure 5.9

Significant differences were found between male and female ratings of overall Satisfaction with Spatial Factors (Table 5.2). Female scores increased by 0.34, while male scores increased by only 0.11.

Tests of Between-Subjects Effects: Overall Satisfaction with Spatial Factors					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.916 <sup>a</sup>	10	.092	2.115	.077
Intercept	.047	1	.047	1.075	.313
Site	.205	3	.068	1.576	.228
Gender	.195	1	.195	4.508	<b>.047</b>
Role	.208	2	.104	2.398	.118
Age_Range	.204	3	.068	1.568	.230
Average Survey 1 Score	.123	1	.123	2.851	.108
Error	.823	19	.043		
Total	1.794	30			
Corrected Total	1.739	29			

a. R Squared = .527 (Adjusted R Squared = .278)

Table 5.2

Examining each site individually, only Rev: Ithaca Startup Works shows significant changes in the overall score for Satisfaction with Spatial Factors, which was consistent with the expectations of this study. These changes were moderated by gender as well (Table 5.3). Both males and females had increasing overall satisfaction with Rev, but

females experienced a larger increase (1.046) than did males (0.202). Further significant differences were noted on specific items.

Tests of Between-Subjects Effects: Overall Satisfaction with Spatial Factors						
Coworkspace	Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
CoLab	Corrected Model	.119 <sup>a</sup>	2	.060	.	.
	Intercept	.111	1	.111	.	.
	Site	.000	0	.	.	.
	Gender	.000	0	.	.	.
	Role	.000	0	.	.	.
	Age_Range	.000	0	.	.	.
	Average Survey 1 Score	.000	0	.	.	.
	Error	.000	0	.	.	.
	Total	.122	3			
	Corrected Total	.119	2			
StudioWest	Corrected Model	.229 <sup>b</sup>	4	.057	7.987	.114
	Intercept	.052	1	.052	7.254	.115
	Site	.000	0	.	.	.
	Gender	.005	1	.005	.743	.479
	Role	.000	0	.	.	.
	Age_Range	.078	1	.078	10.835	.081
	Average Survey 1 Score	.058	1	.058	8.112	.104
	Error	.014	2	.007		
	Total	.252	7			
	Corrected Total	.244	6			
Stream	Corrected Model	.334 <sup>c</sup>	6	.056	3.185	.141
	Intercept	.014	1	.014	.774	.429
	Site	.000	0	.	.	.
	Gender	.068	1	.068	3.921	.119
	Role	.000	1	.000	.012	.917
	Age_Range	.150	3	.050	2.853	.169
	Average Survey 1 Score	.017	1	.017	.998	.374
	Error	.070	4	.017		
	Total	.429	11			
	Corrected Total	.404	10			
Rev	Corrected Model	.638 <sup>d</sup>	5	.128	3.439	.169
	Intercept	.000	1	.000	.008	.933
	Site	.000	0	.	.	.
	Gender	.379	1	.379	10.225	<b>.049</b>
	Role	.295	1	.295	7.961	.067
	Age_Range	.315	2	.157	4.248	.133
	Average Survey 1 Score	.048	1	.048	1.299	.337
	Error	.111	3	.037		
	Total	.991	9			
	Corrected Total	.749	8			
<i>a. R Squared = 1.000 (Adjusted R Squared = .), b. R squared = .941 (Adjusted R squared = .823)</i>						
<i>c. R Squared = .827 (Adjusted R Squared = .567)</i>						
<i>d. R Squared = .851 (Adjusted R Squared = .604)</i>						

Table 5.3

## Variety and Flexibility

For the statement “I can always find a place to carry out collaborative work when I need it,” significant differences were found between female and male participants (Table 5.4). Female participants showed an increase in satisfaction over time (0.595) while male participants showed a slight decrease (-0.91).

Tests of Between-Subjects Effects: “I can always find a place to carry out collaborative work when I need it.”					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9.306 <sup>a</sup>	10	.931	1.995	.094
Intercept	2.395	1	2.395	5.136	.035
Site	.562	3	.187	.402	.753
Gender	1.922	1	1.922	4.122	<b>.057</b>
Role	1.316	2	.658	1.411	.268
Age_Range	.393	3	.131	.281	.839
Average Survey 1 Score	3.917	1	3.917	8.399	.009
Error	8.861	19	.466		
Total	19.000	30			
Corrected Total	18.167	29			

*a. R Squared = .512 (Adjusted R Squared = .256)*

Table 5.4

For the statement “I can always find a suitable place for certain types of conversation or collaborative work,” significant differences were found based on role (Table x.x). Participants who viewed themselves primarily as staff members had a slight decrease (-0.141) while members had a slight increase (0.423). Those who were members of the coworking cooperative experienced a large increase in agreement with this item (2.145). In a pairwise comparison, the largest difference was shown to be between staff members and cooperative members.

Tests of Between-Subjects Effects: "I can always find a suitable place for certain types of conversation or collaborative work."					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	22.914 <sup>a</sup>	10	2.291	4.404	.003
Intercept	5.624	1	5.624	10.808	.004
Site	2.812	3	.937	1.801	.181
Gender	1.053	1	1.053	2.024	.171
Role	3.845	2	1.922	3.695	<b>.044</b>
Age_Range	.316	3	.105	.203	.893
Average Survey 1 Score	12.229	1	12.229	23.501	.000
Error	9.886	19	.520		
Total	34.000	30			
Corrected Total	32.800	29			

a. R Squared = .699 (Adjusted R Squared = .540)

Table 5.5

For the statement "The arrangement and furnishing of kitchen/coffee areas support collaborative work there," significant differences were found based on three variables: site, gender, and age (Table 5.6).

Tests of Between-Subjects Effects: "The arrangement and furnishing of kitchen/coffee areas support collaborative work there."					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	17.684 <sup>a</sup>	10	1.768	6.091	.000
Intercept	3.827	1	3.827	13.182	.002
Site	3.691	3	1.230	4.237	<b>.019</b>
Gender	3.849	1	3.849	13.256	<b>.002</b>
Role	.025	2	.012	.042	.959
Age_Range	3.817	3	1.272	4.383	<b>.017</b>
Average Survey 1 Score	5.843	1	5.843	20.125	.000
Error	5.516	19	.290		
Total	28.000	30			
Corrected Total	23.200	29			

a. R Squared = .762 (Adjusted R Squared = .637)

Table 5.6

Participants at CoLab Hive and Stream Collaborative showed a decrease in agreement (-0.136 and -0.753, respectively) with this statement, while participants at Studio West and Rev showed an increase in agreement (0.564 and 0.241, respectively).

Male participants showed a decrease in agreement with this statement (-0.512) while female participants showed an increase (0.470). Participants over the age of 29 showed increasing agreement with this statement, while participants under the age of 29 showed a decrease in agreement.

### Openness and Access

The survey did not directly measure sense of openness and access, but these features were discussed in interviews and observed directly. At all four sites, members stated that they enjoyed being able to see who was around. During observations, members were seen moving around the open space just after their arrival, checking to see who was present and stopping for short greetings. Participants agreed almost unanimously that they greeted each other when they arrived, and in observations it was noticed that arrivals and departures caused small ripples of disturbance that spread throughout the space, followed by brief waves of casual conversation before resettling.

Easy access to other members was mentioned in many interviews, especially as it pertained to seeking advice. Members at all four sites stated that it was convenient to have others around, so they could ask for advice without even getting up from their desks. At Rev, in particular, members stated that it was useful to have others within easy reach to act as a sounding board for ideas.

### Personalization and Territoriality

The survey did not directly measure sense personalization or territoriality, but these features were discussed in interviews and observed directly. Only one site (Stream Collaborative) has territorial desks, which are assigned as part of the membership contract. If a member was part-time, they might share a desk with another part-time

member on a different schedule. In interviews, members at Stream referred to the spot they were assigned to sit as “my desk,” even if they shared that desk with another part-time member.

CoLab Hive is not territorial by assignment, but members frequently return to the same spot to work and leave their equipment set up. There is no policy supporting or preventing this, so far. Members have gone so far as to build themselves standing desk support trays and decorate their areas, making for a high degree of personalization. Because of this, CoLab was designated as territorial as well.

In addition to personalizing their workstations, members at both Stream and CoLab personalize other parts of the workspace. At Stream there are wall-mounted tackboards on which members can display their work; each member has a designated section, near her or his desk. Members frequently talked about these tack boards in interviews, stating that they enjoyed showing their work and seeing the work of others.

#### Auditory Privacy and Distraction

For the statement “I feel distracted by people’s voices from meeting rooms/spaces near workstations,” significant differences were found based on the age range of participants (Table 5.7). Participants over the age of 29 showed decreasing satisfaction, and increased feelings of distraction, while participants under the age of 29 showed an increase in satisfaction – signifying lower feelings of distraction.

Tests of Between-Subjects Effects: "I feel distracted by people's voices from meeting rooms/spaces near workstations."					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9.988 <sup>a</sup>	10	.999	2.409	.048
Intercept	2.008	1	2.008	4.842	.040
Site	1.742	3	.581	1.400	.273
Gender	.111	1	.111	.268	.611
Role	.615	2	.308	.742	.490
Age_Range	4.233	3	1.411	3.403	<b>.039</b>
Average Survey 1 Score	1.594	1	1.594	3.844	.065
Error	7.878	19	.415		
Total	18.000	30			
Corrected Total	17.867	29			

a. R Squared = .559 (Adjusted R Squared = .327)

Table 5.7

For the statement "I am distracted by people talking in kitchen/coffee areas," significant differences were found between female and male participants. Both males and females exhibited a decrease in satisfaction, and an increase in distraction, but males decreased less (-0.096) than females (-0.642) (Table 5.8).

Tests of Between-Subjects Effects: "I am distracted by people talking in kitchen/coffee areas."					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.605 <sup>a</sup>	10	.360	1.344	.277
Intercept	1.242	1	1.242	4.633	.044
Site	.465	3	.155	.578	.636
Gender	1.195	1	1.195	4.455	<b>.048</b>
Role	.038	2	.019	.071	.931
Age_Range	1.032	3	.344	1.282	.309
Average Survey 1 Score	.521	1	.521	1.943	.179
Error	5.095	19	.268		
Total	9.000	30			
Corrected Total	8.700	29			

a. R Squared = .414 (Adjusted R Squared = .106)

Table 5.8

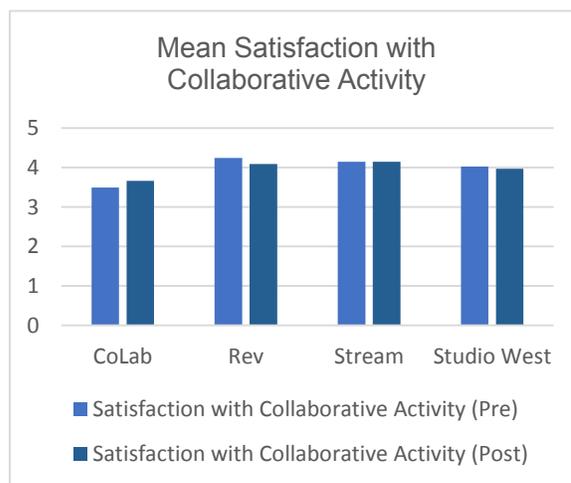
During observations, phone calls were noted to be a source of distraction for both coworking members and the investigator. Other noises in the office, such as printing, typing, or conversations between two or more members, were also heard. In interviews, participants mentioned that they were sometimes distracted by noise. Distractions from

within the coworkspace were mentioned much more often at Rev (50%), CoLab (40%), and Studio West (33%) than at Stream (0%). At Stream, however, distractions from outside street noise were mentioned 22% of the time. Outside noise was also a source of distraction at Rev (20%).

When someone arrived in the space, there was often a short greeting conversation between them and the members already present. Greetings and goodbyes took place at a normal speech volume, while side conversations were often conducted more quietly.

### 5.3.2 Satisfaction with Collaboration in the Workplace

Survey items 22 through 42 measured the participants' satisfaction with the amount of collaboration they perceived within their coworkspace. All sites had high ( $\bar{x} > 2.5$ ) satisfaction scores for spatial factors (Figure 5.10). Scores were stable over the study period, with no significant changes by site.



Significant differences were found between ratings of overall satisfaction with collaboration, based on the participant's self-reported role within the coworkspace (Table 5.9). Scores for those who were primarily staff members decreased (-0.368), while scores for members and members of a cooperative increased (0.102 and 0.144, respectively).

Tests of Between-Subjects Effects: Overall Satisfaction with Collaboration					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.470 <sup>a</sup>	10	.147	1.611	.182
Intercept	.238	1	.238	2.613	.123
Site	.142	3	.047	.519	.674
Gender	.018	1	.018	.199	.661
Role	.832	2	.416	4.559	<b>.025</b>
Age_Range	.142	3	.047	.519	.674
Average Survey 1 Score	.252	1	.252	2.762	.114
Error	1.642	18	.091		
Total	3.117	29			
Corrected Total	3.111	28			
a. R Squared = .472 (Adjusted R Squared = .179)					

Table 5.9

Examining each site individually, the source of the significant change is shown to be the site Rev: Ithaca Startup Works. Staff members at Rev showed a decrease in satisfaction (-0.282), while members showed an increase (0.483) in their overall satisfaction with collaboration scores.

During interviews, the appeal of collaborative activity was mentioned as a draw for many participants (23%), including staff. Working interactions were reported less often than social interactions, however. The most common working interaction was getting (82%) and giving advice (82%). Participants also stated that they shared working knowledge (32%), hired one another as sub-contractors (18%), and asked for opinions on project ideas (5%).

Forty-one percent of participants stated that socialization was a major reason they chose to work at a coworkspace. Most participants agreed that they engaged in social interactions with other coworking members while in the coworkspaces. These interactions were primarily greetings and small talk (86%), although many members did talk about life matters, such as children and recent or upcoming plans (55%). Social interactions outside of the coworkspace also took place, with most members taking part at least once (64%).

Outside social interactions often took place over food or drinks, though one trio of members has a lunch-time basketball game. Many participants also stated that they had made friends while working in their coworkspace (86%).

Further significant differences were found based on fixed factors – specifically, the participant’s role within the coworkspace and the gender of the participant. Post hoc analysis was conducted to better understand these differences in participants’ experiences.

Additional Significant Differences

For the statement “There is a strong line of trust between other coworking members and me,” significant differences were found based on the role of the participant (Table 5.10). Both staff members and cooperative members showed a decrease in agreement (-0.449 and -0.193, respectively), while members showed an increase (0.552).

Tests of Between-Subjects Effects: “There is a strong line of trust between other coworking members and me.”					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	14.590 <sup>a</sup>	10	1.459	3.829	.006
Intercept	6.111	1	6.111	16.040	.001
Site	2.814	3	.938	2.462	.096
Gender	.029	1	.029	.077	.784
Role	3.480	2	1.740	4.567	<b>.025</b>
Age_Range	.837	3	.279	.732	.546
Average Survey 1 Score	7.284	1	7.284	19.119	.000
Error	6.858	18	.381		
Total	22.000	29			
Corrected Total	21.448	28			

a. R Squared = .680 (Adjusted R Squared = .503)

Table 5.10

For the statement “Collaboration is highly valued in this coworking space,” significant differences were found based on role (Table 5.11). Staff members showed a decrease in agreement (-0.817), while members showed an increase (0.046) and cooperative members showed a larger increase (0.411).

Tests of Between-Subjects Effects: “Collaboration is highly valued in this coworking space.”					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.534 <sup>a</sup>	10	.553	1.932	.108
Intercept	1.193	1	1.193	4.164	.056
Site	.540	3	.180	.628	.606
Gender	.334	1	.334	1.166	.294
Role	3.065	2	1.532	5.350	<b>.015</b>
Age_Range	.533	3	.178	.620	.611
Average Survey 1 Score	1.338	1	1.338	4.673	.044
Error	5.155	18	.286		
Total	11.000	29			
Corrected Total	10.690	28			
a. R Squared = .518 (Adjusted R Squared = .250)					

Table 5.11

There was no difference in attitude expressed by staff and members during interviews. Both staff and members expressed feelings of trust and interest in collaboration with other coworking members in the space. For staff, the possibility of collaboration with others was cited as a reason they opened or began working at the coworkspace. For members, collaborative activity was one reason they sought out a coworkspace. Both staff and members who had collaboration experiences with other members spoke of them with positive regard and stated that they found these experiences very valuable.

For the statement “I exchange information/ideas frequently with other coworking members through face-to-face communication,” significant differences were found based on gender (Table 5.12). Both males and females showed a decrease in agreement, but females (-0.705) showed a greater decrease than males (-0.056).

Tests of Between-Subjects Effects: "I exchange information/ideas frequently with other coworking members through face-to-face communication."					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7.283 <sup>a</sup>	10	.728	2.700	.032
Intercept	1.398	1	1.398	5.182	.035
Site	1.840	3	.613	2.274	.115
Gender	1.546	1	1.546	5.734	<b>.028</b>
Role	1.479	2	.739	2.741	.091
Age_Range	1.230	3	.410	1.521	.243
Average Survey 1 Score	.751	1	.751	2.784	.113
Error	4.855	18	.270		
Total	13.000	29			
Corrected Total	12.138	28			

a. R Squared = .600 (Adjusted R Squared = .378)

Table 5.12

Differences in communication patterns based on gender were not mentioned in interviews, nor were they observed in the spaces. Members of both at all four spaces commented that they had made friends while working there, and these friendships were with both males and females. In addition, women were actually more likely to mention making friends in the space (100%) and socializing outside of the space (75%) than men. Women and men were equally likely to mention collaboration and advice-seeking in the space. Men were more likely to test ideas on other members (10%) than women (0%). Men were also more likely to talk about family and life (48%) than women (25%).

#### 5.4 Additional Findings

Other factors not measured by the survey emerged as meaningful to participants in interviews. Participants varied in their opinions on the best physical aspects of the workplace, but three aspects emerged as important across all sites: large, high windows (55% of responses), the overall aesthetic of the décor (46%), and the location of the building in the Ithaca community (50%). Thirty-two percent of participants cited the professional atmosphere of their coworkspace as a major draw; many of these same

people also stated that they felt uncomfortable meeting with clients in their home or a coffee shop. The conference room was a large part of this professional atmosphere, and many cited it as a draw for them (27%). The shared technological resources, such as printers and scanners, were also a draw (27%), as was reliable high-speed Internet (14%).

#### 5.4.1 CoLab

Results from interviews that were specific to CoLab Hive included more emphasis on the building age, history, and location than at other sites. Less emphasis was placed on interior décor, plants, or art, despite the fact that CoLab contains all of these elements in comparable amounts to the other sites.

The largest difference in emphasis at CoLab was on sense of belonging. Two out of four members interviewed at CoLab stated that the main reason they chose CoLab as their coworkspace was that they felt they belonged there. These participants were comparing CoLab to other coworkspaces, including others in the Ithaca community. One stated that he could feel - as he walked into another space - that he wasn't "cool" enough to be there; at CoLab, he walked in and felt that he belonged. He expressed this both in terms of people and décor. In contrast, sense of belonging was not mentioned during interviews at Rev and Studio West, and it was mentioned infrequently at Stream (17%).

Members at CoLab had less emphasis on outside socialization with other members, and fewer of them agreed that they had made good friends while in the space. This may stem partly from the fact that most members at CoLab knew each other prior to creating the space, so friendships had already formed.

#### 5.4.2 Rev

Participants from Rev had several points of emphasis in interviews that differed from other coworkspaces in this study. They described more frequent interactions around testing out ideas, sharing knowledge, and general socializing in the coworkspace. Like CoLab, few of the Rev members said they socialized with others outside of the coworkspace.

Members at Rev were also extremely positive about the furniture in the space, specifically the chairs. Comfort of the workstations was a major emphasis for most interview participants, followed by the aesthetic quality of the furniture in the space. Less emphasis was placed on building history, style, or location than at the other three sites, although participants from Rev also expressed positive reactions toward the high windows in the space. Another physical feature of Rev that participants reacted positively to was the openness of the main space.

Unlike other workspaces, many participants from Rev had not worked in a traditional office before coming to the coworkspace. Some of them came there directly after graduating college and had previously only worked at home or in a school setting.

Two unique features of Rev, described by interviewees as positive attributes, are the prototyping workshop and presence of formal mentors in the space. None of the other three coworkspaces offer these features, so responses to these questions were not comparable to other sites. Members at Rev felt that the workshop was an asset to their company (20%) and that the presence of the mentors was beneficial to their growth as a company (80%).

### 5.4.3 Stream Collaborative

Members at Stream put a lot of emphasis on collaboration during their interviews. They discussed sharing knowledge, sub-contracting one another for projects, and a great deal of casual advice-giving and –getting in the coworkspace. Stream participants also had the highest rate of outside socialization (78%), including a lunch time pick-up basketball team that had formed between members.

Many participants at Stream had a large range of previous workspace experiences, including home offices, traditional offices, academic settings, libraries, and private offices. Most of them agreed that socialization and collaborative activity were the reasons they sought out a coworkspace, along with the economic incentive of shared resources. Many participants felt more productive when they were in the workspace, compared to a home or private office they had experienced.

Physical features that appealed to members of Stream were the décor (which many of them had participated in creating), the location, high windows, and the building character. They cited the professional atmosphere, specifically the availability of the conference room, as an important benefit to them.

A unique feature of Stream that could not be compared across sites was the existence of the member work display areas. These are large tack boards that span most of the walls in the coworkspace, and members use them to create displays of projects they are currently working on or have recently completed. Many members mentioned them in their interviews, citing them as useful resources for keeping track of what other members were working on.

#### 5.4.4 Studio West

Out of the four sites in this project, members at Studio West were the most likely to socialize with one another outside of the coworkspace, and to agree that they had made new friends because of working in the space. Like members at other sites, they engaged in a great deal of advice-giving and –getting, but members at Studio West felt that it primarily happened due to overhearing a need for help, instead of a specific request from one member to another. One participant stated that he would often simply raise his voice and ask if anyone knew how to help with a problem he was having, which often produced good results.

Many participants stated that they felt more productive when at the coworkspace, as opposed to working from home. Sharing resources was also a major draw for Studio West members. One member at the space arrived as a copy machine sales and repairman, and decided to join the studio after he perceived the space would offer him business benefits. The other members enjoyed his presence because he was always able to offer assistance with the copier/printer.

Studio West puts a special emphasis on displaying local art on their walls; these displays change every month. Members stated that they enjoyed this feature. For example, one said it was important to him because he “had to look at a wall all day,” so he preferred it have decoration. Another participant pointed out that the artist whose work was displayed during the time of his interview happened to be his girlfriend; she had been invited to display her art at Studio West after coming to events with him and meeting the owner.

Another of members' favorite physical features at Studio West is the combination of large front windows and an abundance of indoor plants. Members often mentioned these two items jointly in interviews, tying them together as one concept.

## 6. DISCUSSION

By examining the user experience at coworkspaces through both quantitative and qualitative methods, this study enriches our understanding of the effect of spatial factors on collaborative activity.

### 6.1 Proximity

Physical proximity and overhearing conversations were two important factors for social interaction in all four sites, based on interviews and observations. Advice-seeking and advice-giving were also very common activities in all sites. Members not only agreed that they sought and gave advice, but their reactions to this question were very positive and animated. The prevailing attitude seemed to be "Why would I *not* seek advice from other members?" given the amount of knowledge each membership group held. When members wanted advice, their first tactic was often to move their chair slightly away from their workstation and ask the nearest fellow worker, or raise their voice a bit and ask if anyone nearby could help. This almost always resulted in a response, either with the necessary advice or with directions to the right person with whom to inquire.

In the case of one space, Rev: Ithaca Startup Works, official Entrepreneurs in Residence (EIRs) act as on-site mentors to answer questions and provide guidance to startups. One participant, an EIR, felt that this led to coworkers feeling comfortable coming to him with "the little stuff," instead of only urgent issues. The participant viewed

this as a positive and constructive relationship, since it helped him address issues for the member before they developed into major problems.

One illustrative example from Rev took place during participant observation. The author was sitting near one of Rev's Entrepreneurs in Residence, who was taking a phone call. A member passed by the table on his way to the coffee area, and then paused when he passed back. He waited until the EIR was finished with his phone call and then asked if he could ask a question. The EIR agreed, and the member asked about the EIR's experience with crowdfunding. This became a much longer conversation about funding start-ups; after approximately 10 minutes, the member revealed that he had received a funding offer of a certain type, and he was trying to decide if he should take it or not. The EIR helped him sort through his options and make a decision.

What is interesting about this interaction, and others like it, is not that advice was needed and given. Rather, it is the casual way in which the advice was sought and received. This member seemed unsure of his actual question at the beginning of the conversation, but the EIR's close physical proximity – and the comfort level achieved by frequently working in close proximity – allowed the member to work his way up to his real interest. The member's body language indicated that he was shy or felt like he might be interrupting, indicating that he was reluctant to bother the EIR at first.

Given how crucial this decision was to the future of the member's business, this seemingly casual interaction was actually extremely important for him. Had he not been able to easily access his mentor, he might have tried to puzzle out the funding package on his own, rather than bother the mentor via phone or e-mail. Speaking face-to-face also

allowed them to have an in-depth conversation on the pros and cons of each funding option.

Based on previous work showing that co-location is correlated with collaboration, and Allen and Fusfeld's (1975) work showing that there is a point diminishing returns in informal interactions past ~30 meters, these interactions make sense. What previous research may not be taking into account, however, is the utility of being within earshot of others who have useful knowledge or potential as collaboration partners. In interviews and observations, overhearing was not only a way that advice-givers noticed a need from advice-seekers, but it also served as a mechanism for starting new conversations and side conversations.

At Stream Collaborative, one participant recounted overhearing a discussion between two other members about billing. Though he wasn't originally included in the conversation, he asked if he could join in, because the topic was one on which he needed advice. He was brought into the discussion, and his questions got answered.

An EIR at Rev related the story of a member seeking advice from him after the pair had overheard a phone conversation being conducted by a third party. This third party was discussing what types of paperwork to have a new employee sign, and the member realized that he didn't know the answer to this, either. He turned to the EIR and asked his opinion, and the EIR helped him to understand the process the member would need for his own business.

One effect of adjacency to others is unofficial monitoring, or a user's feeling of being monitored even if no one is actually doing so. During interviews for this project, the concept of unofficial monitoring was raised by several participants. Participants stated

that they felt they got more work done at their coworkspace, because there were other people around and it would be visible if they were not working – despite the fact that it is no one person’s job to check up on the status of everyone’s tasks. In fact, one of the things that is supposedly appealing about coworking is the level of autonomy users have over themselves, and the feeling that they’re all responsible for keeping track of their own work, instead of being micromanaged. There is a paradox at play here: tension between wanting freedom to govern one’s own behavior, while also admitting that one is not always on-task if left to one’s own devices.

## 6.2 Openness

The four coworkspaces studied have much in common physically. Despite the differences in their overall square footage and budgets; each one has a large open work space combined with two private work rooms. At the three larger sites (Rev, Stream, and Studio West), participants often mentioned that they enjoyed being able to see one another across the room. Arriving at the space and being able to quickly assess who is there, and where they are working, was valued at all four sites. Three of the sites – Stream, Studio West, and CoLab – have similar percentages of openness, despite their different square footage. Rev has a larger percentage of openness, but the open area is in an L-shape that breaks it up into two different zones. These zones are further marked out by different furniture; one side has tables and chairs for working, and the other has soft furniture in a lounge area.

In the literature, openness has definite advantages and disadvantages. Other studies using the same survey measure find that too much openness can lead to feelings of distraction, which actually reduces perceived support for collaboration (Hua, Loftness,

Heerwagen, & Powell, 2010; Hua, Loftness, Kraut, & Powell, 2010). A space like Rev might be too distracting, if the large open area were not broken up in some way. Rev was the only space at which distraction came up repeatedly in interviews, and some participants even complained about it openly. One member who was interviewed mentioned that he specifically chose corner seats or seats far from the doors, to minimize his exposure to traffic through the open area. He explained that once his concentration was broken by a distraction, he found it very hard to re-focus.

### 6.3 Variety and Flexibility

Overall, all four sites had high satisfaction with the variety of the coworkspace. While each space differs in terms of size and aesthetic, the core components of each space are actually very similar: a main open work area with two conference/breakout rooms, and access to food, shared office resources, and WiFi. Physically, the buildings are also similar: long-standing structures in Ithaca located near the commons. The coworkspaces in this study are all housed in a second story space (in the case of Studio West, a split-level) with high windows, allowing for a great deal of natural light to enter the space. It stands to reason that satisfaction would be similar between sites; given that the spaces support the daily activities of members, it also makes sense that satisfaction is above the expected mean.

Significant differences were found between male and female ratings of overall Satisfaction with Variety. The differences in overall satisfaction with variety for women and men can be attributed, in part, to commonly found differences in workplace satisfaction between men and women. It has been noted that men are more critical of their workspaces, in general, while women tend to be more satisfied (Dinç, 2009).

Because each space contains a main open work area with workstations that are not divided by barriers, members at each coworkspace feel that they can easily interact with one another. This aligns with the finding of high satisfaction with perceived support for collaborative activity. Additionally, the focus and philosophy of the coworking movement, overall, is aimed at those who want to collaborate with one another. It is likely that most members seeking out a coworkspace have collaboration as a goal, and view the coworkspace as one means by which they can achieve that goal.

#### 6.4 Auditory Privacy and Distraction

Privacy is a complex issue at these sites, as well as other coworkspaces. Members value the openness of the space, which gives them visual and auditory access to people and ideas in the space, but this same access can lead to lack of privacy or a sense of distraction. This was especially true of older members, though it is not clear whether this is due to a physiological effect of age or a training effect of being used to more private offices.

During interviews, many members admitted that there were sometimes distractions or a lack of privacy in the space, but they felt more productive, overall, while they were there. They felt that the socialization was beneficial, and that minor disruptions offered them a chance for short breaks. Many viewed these disruptions positively, citing health reasons for not wanting to be sedentary for long periods of time. Lee's (2010) work on open-plan offices, distraction, and satisfaction supports this reaction; users who are mentally prepared for the possibility of distractions in open-plan layouts, and who see the benefits to collaborative activity, are more satisfied with the situation.

Because areas in which food or resources are available tend to be areas in which people cross paths – while waiting for a document to print, or while waiting for their lunch to heat in the microwave – these areas often have a high degree of informal interaction. This was true of food spaces in this study, but it was not observed at printer stations. The same pattern was shown in survey responses, with participants noting distraction only from food/kitchen areas, not from common printer areas.

Consistent with prior research (Emberson, Lupyan, & Goldstein, 2010; Sundstrom, Town, Rice, Osborn, & Brill, 1994; Banbury & Berry, 2005), phone calls were a major source of concern in all four sites. Some participants did note being distracted by other members taking phone calls in the space, but more often, participants reported concern that their own phone calls were bothering others. Several people reported a reluctance to turn their ringer on in the coworkspace, and others stated that their main source of confusion was where to go to take a phone call. During observations of the spaces, members would move extremely quickly to leave their workstation when a phone call came in; at times, their haste almost made as much disturbance in the space as the call ringing in. The level of concern members expressed for the disturbances caused by their own phone calls could be interpreted as a projection of how much they feel disturbed by phone calls that others take. The phone issue was a persistent one throughout the study period, and each space is experimenting with different policies for minimizing distractions.

At Rev, in particular, phone calls were very noticeable. This was due in part to the fact that many people kept their ringers on (instead of setting the phone to vibrate or silent), and also due to the physical reaction a member had to receiving a phone call. They would leave their workstation in a hurry, to avoid distracting those around them, and

in fact often caused more distraction than if they had left slowly while talking on the phone. As noted previously, research indicates that these interactions may be distracting for both listeners and callers; listeners find only half a conversation more distracting than a full conversation (Emberson, Lupyan, & Goldstein, 2010), while callers feel a sense of infringement on their territory when someone else can overhear their call (Ruback, Pape, & Doriot, 1989).

### 6.5 Personalization and Territoriality

When users cannot permanently personalize their workspaces, they will temporarily add items to their chosen workstation and then remove these at the end of the day (Hartjes-Gosselink, 2009). This was observed in all four coworkspaces to varying degrees; the most common form of temporary personalization is personal technology itself. Laptops and carrying bags with stickers were commonly seen in all four spaces, as were personalized mouse pads, mugs, and notebooks. The act of setting up one's workspace for the day was a ritual of personalization, as well as delineating territory; not only do the personal belongings around a member express some part of their interests or personality, they also take up a certain amount of space. Cords, bags, notebooks, and laptops make very effective implicit boundaries in non-territorial settings.

Conversely, the sites that had territorial desks had implied boundaries of their own, beyond which personal effects seldom strayed. At Stream Collaborative, this implied boundary is partly marked out by the seam lines between workstation tables. Members often tried to keep pens and papers on or near this line. At CoLab Hive there are no seam lines between workstations, but members seem to have found an even allotment of

personal space between each workstation; again, personal effects and papers seldom strayed beyond this invisible border.

This invisible boundary is not always clear, however, and some coworking sites take measures to help members understand the extent of their space. At a site in London, Founder London, the author was introduced to an innovative barrier made only of thread. The operators of Founder London installed them after members said they were unsure what part of the table was “theirs,” and the threads were considered a great success. Their delicate, ephemeral nature led to users treating them carefully, and thus respecting the invisible boundaries made visible (Illustration 6.1). The threads



*Illustration 6.1: Thread barrier at Founder London*

were inspired by the work of a local sculptor, and the operators of Founder London felt they were in keeping with the space’s artistic aesthetic.

Signs of collective personalization were seen at all four sites, and collective personalization was especially strong at CoLab Hive and STREAM Collaborative. Members at CoLab work together to build furniture and arrange plants, coffee/tea areas, and collectively used counter surfaces. The space takes on a sense of lived-in comfort and homeliness thanks to the asymmetry of the furniture and mnemonic decorations, which accurately represents CoLab’s identity to newcomers (McCracken, 1989). At CoLab, members leave small knick-knacks and other items, such as musical instruments and books, around the space. Many of these items are part of the shared landscape of

material culture at CoLab, which was unique among the four sites. This uniqueness reflects CoLab's unique membership structure and culture; both the managers and members believe in making decisions cooperatively, and a collective identity is aligned with this philosophy.

At Stream, early members participated in painting the space and decorating the floor with lacquered layers of brown paper bags. The real personalization at STREAM, however, is the emphasis on displays of members' work. The tack boards around the space can be viewed as both individual displays and collective; they allow members to put up images of completed or current projects, but they also serve to create a collective image for the space. By seeing similar types of projects displayed side by side, with few borders between one member's work and another, a unified message about the type of work that is conducted about STREAM is displayed for guests and new members.

Coworkspace membership is voluntary, so members do not need to exert as much self-expression to cope with being in their office all day (Lee & Brand, 2005; Zeisel, 2006). Because members can choose the sites in which they work, the style of the building and the décor of the space could be viewed as proxies for personalization. The participant who said he felt he fit in better at CoLab than Studio West was implying that something about the atmosphere, which he was unable to fully articulate, appealed to him. If members choose a space partly based on their personal aesthetics, it could be fulfilling their need for personalization in the workspace. Choosing a coworkspace that partly expresses one's own personal taste is, in fact, a form personalizing the workspace.

One downside of a non-territorial space is that visitors, or even other members, are not always clear on where to find a certain member. This was reflected in interview

responses at both non-territorial sites (Rev and Studio West), as well as one of the territorial sites (STREAM), where members suggested that they didn't know how to receive guests or visitors for a business meeting. Guests were observed acting confused, lingering in the doorway of the coworkspace, and asking members who were physically nearby for assistance in finding the member they were looking for. Some participants suggested in interviews that their coworkspaces might be improved by having some kind of reception area or protocol for meeting guests.

### 6.6 Alternative Workspaces

Members who had previously worked at home or in their home office perceived the coworkspaces as an improvement because of a reduction in distractions. At their homes, members were often distracted by chores, family members, and physical objects related to their own hobbies or interests. They also felt that working at home did not project a professional atmosphere, making them feel both less productive and more concerned about how clients would react to their workspace.

Several members had the experience of renting their own private office before moving to a coworkspace. During interviews, they unilaterally agreed that loneliness and a desire for more social interaction were motivating factors in choosing to move to a coworkspace. Several of them also indicated that they hadn't realized just how lonely they would be in a private office. That loneliness spurred them to actively seek out a more social work setting, which led them to a coworkspace.

### 6.7 Other Features

As Hartjes-Gosselink (2009) notes, staring at blank walls can cause discomfort and stress among workers, especially in non-territorial settings. By including art, Studio

West and CoLab are helping to alleviate some of this tension from lack of visual stimulation. Art can also provide mental relief and restoration (Kaplan, Bardwell, & Slakter, 1993).

At Studio West, the art displays also serve a social role. Owner-operator Greg Kops has a strong intention to make Studio West a community space, and displaying work from Ithaca artists is one way he does this. He opens the space to the general public on gallery walk nights, bringing new faces into the Studio for socializing.

Like art, plants have restorative mental effects on viewers (Kaplan, Bardwell, & Slakter, 1993; Berman, Jonides, & Kaplan, 2008). All four spaces in this study contain plants, from small desk plants at Rev and Stream to larger plants at CoLab and Studio West. Members commented on their enjoyment of the plants during interviews, even the smallest ones on windowsills or shelves. This is consistent with literature showing that, while plants may not affect indoor air quality, workers frequently report higher satisfaction when plants are present inside the workplace (Larsen, Adams, Deal, Kweon, & Tyler, 1998; Chang & Chen, 2005).

## 6.8 Role Conflict

Staff members at coworkspaces often have to manage two or more roles; not only do they work in the space as a member would, but they also have responsibilities for the function of the space. Because coworkspaces are not extremely lucrative, they are often labors of love; the owner is also the operator, and sometimes the only full-time staff member. The sites in this study are no exception; only one, Rev, has full-time staff, and even then the staff consists of just one person. Interns and part-time help are used at some sites, but most of the work of managing the space falls to the owner. Taking into

account that all site owners have their own businesses to run as well, one can see how role conflict can play a part in staff experience of a coworkspace.

In this study, staff members displayed a decrease in satisfaction with collaboration and sense of trust with other coworking members. Although these attitudes were not expressed directly in interviews, staff members frequently described the challenges of managing member expectations – trying to make everyone happy is typically impossible. Often, staff members wanted to improve the coworkspaces to meet member requests, but the improvements were either physical or financially not feasible. Some participants felt defeated about this situation, wanting to make their members happy but being unable to do so.

In addition, staff and owners who conduct their own work in their coworkspaces are much more prone to disruption than other members. If a printer breaks, a guest arrives and doesn't know where to meet someone, or the heat is malfunctioning, the owner or staff member must set aside their member-like activity and focus on problem-solving in their staff role. Staff also mediate disputes between members, should conflicts arise. When a member is uncomfortable with someone else's use of the space (often related to taking phone calls, in this study), it is up to the owner or staff to find a way to approach each part and remedy the situation. This can put uncomfortable focus on the staff member as the bearer of bad news, or the sheriff of the space.

While staff members did not explicitly articulate dissatisfaction with coworkspace during interviews, this sentiment did appear as significant on surveys. The small conflicts and disruptions that staff have to deal with is the most likely culprit for lowering their satisfaction, as is the inherent sense of tension created by their dual roles within the site.

Role conflict has been shown to be a source of dissatisfaction and burnout in other work settings (Acker, 2004; Coverman, 1989). Fortunately, flexible work scheduling – as is provided by a coworkspace – is one factor that can reduce role conflict related tension for workers (Rau & Hyland, 2002). Managing role conflict for owners and staff of coworkspaces is crucial to their success. When spaces are owned and managed by just one or two people, the success of the space hinges on those people being able to continue their work. If they become too stressed or lose their sense of enthusiasm for running the space, the coworkspace is in danger of closing. Creating a most supportive environment, in which both members and staff are able to enjoy working and feel a sense of social support, is an important factor to reducing stress on staff.

#### 6.9 Gender and Collaboration

The participants in this study had differing experiences of the space based on their gender. This is not surprising, considering the large body of research demonstrating that men and women may react to space in different ways (Zeisel, 2006; Stokols, Rall, Pinner, & Schopler, 1973), have different territorial needs, and use personalization differently in the workplace (Wells, 2000; Brown, 2009).

In survey results, women were generally more satisfied with their coworkspaces than men. When it came to face-to-face communication, however, women's satisfaction declined significantly compared to men. It is unclear why this effect occurred, but it may be due in part to the gender composition of the four sites. In all four sites, there were more male than female members. At the beginning of the study period, for example, Rev had only one female member. Even when all members share common values – a focus on sharing resources and helping startups succeed – it can be isolating to be the only person

of one gender or ethnicity (Ott, 1989). In contrast, when multiple women are present in a work setting, they often collaborate with one another more than they collaborate with male co-workers (Bozeman & Corley, 2004). This was not an option at most sites in this study, and its absence could lead to female members working in isolation more often than male members.

Collaboration and sharing work resources could also be viewed as stereotypically female activities, which is incongruous with a membership base that is primarily male. Alvesson (1998) demonstrated that in a stereotypically feminine work setting, males often overcompensate by acting in a more stereotypically masculine way. This dynamic was difficult to assess during this study, since members were not observed outside of the space, and thus their behavior could not be compared to other settings.

#### 6.10 Boundary Objects

Boundary objects are focal points, virtual or physical, that allow users from various disciplines and perspectives to interact (Arias & Fischer, 2000; Star & Griesemer, 1989). These objects have a mutable meaning that can be interpreted in various ways by different users, making them a good point at which to ease conflict or overlap different organizational meanings. In much of the literature, boundary objects are treated as points of collaboration or shared meaning between parties that may have differing agendas. In coworkspaces, boundary objects are those artifacts that allow members from different businesses to learn more about one another and share expertise.

In large organizations with a variety of specialized departments, boundary objects can be crucial to facilitating interaction. At Adweb, an ad agency with four major departments, coordinating activities was difficult for several reasons: differing work habits,

different work lexicons, and different preferences for interaction (Kellogg et al, 2006). It was still important, however, to coordinate work tasks for projects across these boundaries. Boundary objects, such as files on the company intranet, facilitated sharing of information.

Boundary objects can also be very important in coworking spaces, because of the highly variable nature of the members' work goals and schedules. A software company, food security non-profit, and a freelance portrait photographer may all work in the same coworking space; without boundary objects to facilitate interactions between them, they may never feel comfortable initiating interactions and sharing knowledge. This means that a lack of boundary objects (and routines) can be a barrier to the formation of new social connections in the space.

Feldman and Pentland (2008) are careful to note, however, that just because an artifact or boundary object exists, it does not mean people will utilize it. If the artifact is created without full understanding of the users' goals and the possible tension between those goals, the artifact may be misused or shunned. Their work on the failed implementation of a software scheduling system is a cautionary tale for both organizational management and space design: failing to understand what is actually important to one's users can result in a significant waste of time and money.

Boundary objects and artifacts may be more successful when they emerge organically, because they have grown to suit the needs of their users (and creators), but it is sometimes necessary to intentionally create and implement such artifacts. Feldman and Pentland's 2008 work is also a cautionary tale for designers of these objects and processes. Users were specifically asked what they needed and wanted, but were unable

to articulate their most important, unconscious feelings. By taking users at their word, and not digging deeper by observing their behaviors and implied values, crucial needs were overlooked.

As in other spaces, boundary objects in coworking sites are both physical and virtual. Virtual calendars and scheduling software are used to coordinate use of the space; these may be open to all users, or only open to some (hosts or staff). The most common physical boundary objects are libraries, often stocked with books on freelancing and design (regardless of the types of businesses housed in a space), and chalkboards. Despite the often high-tech personas of coworking sites, chalkboards are nearly universal in their popularity as communication displays. White boards are also popular, but these are more commonly used for actual work and brainstorming. Blackboards, on the other hand, have colorful and decorative images that also provide information about upcoming events or give users the chance to scrawl their own doodles and questions.

The most overt example of a boundary object in the four sites in this study is the display tack board at Stream Collaborative. These were in constant use during visits to the space, and the contents of the display were always being updated. Members were proud to show their work on the display boards, and also eager to see what other people would put up in their spaces. The display boards were used as props during member meetings and an open house event, to allow members to reference their current work during discussions.

Conversely, participants at the other three spaces all expressed some level of interest in having a similar boundary object in their own coworkspace. This interest was not related to having seen the display boards at Stream; members at Rev and Studio

West, in particular, thought up the idea on their own and mentioned it during interviews. They felt it would be a good way to learn more about other members' projects and keep up to date. The solution of a display board seemed intuitive to them as a first step toward generating communication.

### 6.11 Coworkspace as a Boundary Organization

Boundary organizations, which are not necessarily located in a physical space, serve to mediate the interaction between discrete groups. These groups have their own individual identities and goals, which are not necessarily aligned with those of other groups – and may, in fact, be in conflict with them. The groups interact through and within the boundary organization because it is a kind of neutral ground, a space which facilitates and emphasizes their common goals and downplays or shields the interaction from their disparate goals (O'Mahony and Bechky, 2008).

O'Mahony and Bechky's work examines two groups that are normally not liable to work in concert with one another: open-source software (OSS) enthusiasts and commercial software developers. OSS developers typically pride themselves on being the opposite of commercial: they seldom sell their work (but do accept donations), their source code is open for alteration and freely traded, and they don't have a slick product. But when it became clear that advantages could had on both sides by partnering with commercial developers, OSS creators were willing to engage. Their boundary organizations were mostly virtual -- as befits their field of work -- and allowed them to protect their overall identity while still learning to interact with one another in a mutually beneficial way.

Following theories in organizational behavior about boundary organizations, this model can be applied to coworkspace. These spaces gives members the opportunity to come together and interact for common purposes – saving money while still having a professional office, having mental stimulation while working – while still maintaining their individual business identities and interests. In the case of startups, these businesses may be direct or indirect competitors with one another – creating similar products or pursuing similar funding streams (O’Mahony & Bechkey, 2008).

The four coworkspaces in this study all display elements of being boundary organizations. They offer a physical, collaborative space in which groups are co-located. These groups are working to further their own individual goals, but they also have a collective goal: to participate in, and (implicitly) contribute to the success of the coworkspace. They may come together temporarily, for the duration of a project, but legally they maintain their autonomy as discrete business entities.

In one specific case, these boundaries have been crossed to form a new business entity. The owner/operator of Studio West merged businesses with a member who ran a graphic design company in October of 2014 to create a company called Think Topography. This merger came about expressly because they two individual companies had been interacting within Studio West for so long, and had reached a level of comfort and rapport that allowed them to take the next step forward and formalize their working relationship. This merger had an additional ripple effect in the Ithaca community, when the newly formed company hired two full-time employees.

There is also some evidence that there is a larger boundary organization at work among these four sites. Cross-site collaboration occurs, and the operators of CoLab,

Studio West, and Stream have participated in business ventures together, either in the past or ongoing. The newly formed Think Topography is also a member of the Rev business incubator program, which allows Think Topography to access the mentorship resources offered at Rev. The founders of Stream Collaborative also joined Rev for the same reasons, and are now in the process of defining new boundaries within their coworkspace and in the Ithaca entrepreneurial community, to better delineate their business from their coworkspace.

Viewing coworkspaces such as these through the interpretive lens of a boundary organization can shed light on some of the appeal of membership. A coworkspace offers entities a safe space for knowledge-sharing and collaboration, as well as economic benefits, without requiring them to legally bind themselves to one another. The businesses maintain separate identities, while sharing an overarching identity as members of the same coworkspace.

## 7. CONCLUSIONS

Like most businesses, coworkspaces must retain and grow their customer base in order to succeed financially. A major part of retaining members is ensuring that they feel supported by the space. When designed with the correct variety of working tasks in mind, a coworkspace can offer members the different types of settings they will need over the course of their working day or week. By providing the appropriate combination of spaces – including a main open work area, one formal and one informal private room, a food and break area, and access to shared amenities – coworkspaces can support most of their members' tasks, which leads to member satisfaction.

One of the major reasons people join coworkspaces is the appeal of socializing, and potentially collaborating with, other coworkers. These informal interactions increase as members become comfortable with one another, primarily by seeing each other on a daily basis and working side-by-side. This effect is most pronounced between members with less experience and members with more experience, or mentor figures. It takes time for a novice in the field to work up the nerve to casually approach a more experienced member, and working in close proximity assists in this process.

Having people close at hand when the need for advice arises is crucial. Many times, advice was only passed on in these coworkspaces because the asker and source were both immediately available to one another. Without these easy, informal interactions, the asker might give up on their question or forget it before they can contact someone for assistance. Important questions would likely not suffer from this, but seemingly small queries – such as the Rev member asking about different types of investor funding – could fall by the wayside, and unintended rewards could go along with them.

One of the downsides to being within easy earshot of other members, however, is that one can hear their work sounds and conversations as well. Most participants in this study admitted to ambivalence regarding noise in the coworkspace; they recognized the usefulness of overhearing informal information, but they also found noises distracting. The most common source of distraction was phone calls, which is aligned with literature on the distracting power of hearing only half a conversation. This distracting quality is not limited to phone conversations; unpredictable traffic noise is also an issue. Coworkspaces that want to minimize auditory distraction should provide semi-private areas for members

to take phone calls, private nooks for longer video calls, and eliminate sources of unpredictable noise infiltrating the space.

Another possible downside to coworkspaces is the lowered ability members have to personalize their work areas and stake a claim to certain portions of the territory. This is offset, however, by the fact that members can choose the coworkspace itself, selecting one that appeals to their personal aesthetic. Features that appealed to members varied; some were attracted to CoLab's homey atmosphere, while others wanted a very professional setting, such as Stream Collaborative. At all four sites, high windows and plants were sources of a great deal of enjoyment. Art was also an appealing feature; two sites (CoLab and Studio West) used it to offset wall-facing desks, while a third (Stream Collaborative) used designs and art generated by members to decorate the space and communicate about member activities. In this way, art created by members serves as a boundary object to facilitate interaction with other members. In addition to creating an appealing atmosphere that will attract members, providing plants and art is an easy and affordable way for coworkspaces to provide elements that will increase member satisfaction in the long term.

When trying to understand the growing appeal of coworkspaces, the concept of a boundary organization is useful for illuminating some of the underlying reasons. In addition to providing economic and social incentives, coworkspaces also offer a safe middle ground in which members can collaborate without impinging upon their legal business identities or personal goals.

Coworkspaces that are satisfying to be in and which send members a clear message about the values of collaboration, while also providing a space for members to

maintain their individual interests, will succeed in fostering interaction and collaboration between members. In the four sites included in this study, these interactions have blossomed into strong network ties of varying kinds: social outings, sports teams, business partnerships, and mentorships. In this way, coworkspaces strengthen the social capital of a community.

## 8. LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

This study examined only a small slice of the global coworking phenomenon, based on data from 32 participants in a rural university town. However, participants were spread across four sites, representing all currently available coworkspaces for professionals in Ithaca, NY. Moreover, participation levels were high at most sites, making this study a robust representation of the Ithaca coworking community.

Two unexpected factors emerged as significant to some findings in this study: gender and age. While prior studies have found differences in satisfaction with elements of the workplace between women and men (Dinç, 2009; Yildirim, Akalin-Baskya, & Celebi, 2007), both of these topics merit further research in the context of coworkspaces. The link between gender and satisfaction in coworkspaces, in particular, should be pursued with more focused research. If there is a disconnect between the stereotypical female character of a coworkspace and the more masculine activities associated with male entrepreneurs and start-up companies, it would be beneficial for owners and members to understand how it affects the atmosphere of coworking.

Finally, privacy and distraction continue to be an important topic for offices that are all or partly open-plan layouts. Recent studies are not in agreement as to whether or not the increased communication and collaboration is worth the decrease in privacy and

focused attention. Further work needs to be done in this area to understand just how much noise and distraction impact performance, and how an individual's appraisal of the tradeoffs impacts the outcomes. It is clear from the dissonance in self-report measures and actual measures of performance that the perception a user has of the level of noise or distraction in their workspace does not always reflect the reality of their situation, and coworkspaces are no exception.

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## **Appendix A: Survey Instrument**

Bonnie Sanborn

M.S. Environmental Psychology Thesis – Survey Template

The purpose of this study is to assess users' experiences with regard to the physical and social aspects of their workspace. The following questionnaire consists of three parts, and will take approximately 20 minutes to complete.

It is our intention that your views be incorporated in the decision making process for future improvements of your work environment to support effective collaboration. We assure you that your answers will be treated in the strictest of confidentiality.

### **Demographic Information**

Name

E-mail Address

1. How long have you been working in this coworking space? \_\_\_\_\_ months
2. Have you ever been a member at another coworking space(s)? Yes No
  - a. If so, what was the name of the site and the duration of your membership?  
\_\_\_\_\_
3. What is your business/company's name: \_\_\_\_\_
4. Briefly describe the type of business/company you work for:
5. Briefly describe the work you do for this business/company:
6. How many other people work for this business/company? \_\_\_\_\_
7. What is your gender: Female Male Undeclared
8. What is your age:
  - Under 20 years
  - 20 to 29 years
  - 30 to 39 years
  - 40 to 49 years
  - 50 to 59 years
  - 60 years or over

### **Part I. Satisfaction with Collaborative Places**

Please indicate to what extent you agree or disagree with the following statements, according to your experience.

When a question asks about "staff members" it refers to the owner, operator, manager, and any other staff who work directly for the coworking site.

When a question asks about “other members” or “other coworking members,” it refers to other users who are members of the coworking space and work there, but do not work for the same company that you do.

When a question asks about “colleagues,” it is referring to other users who work for the same company that you do.

Assume that “workstation” refers to the spot, or type of desk, at which members typically work.

The term “collaborative places” refers to places where conversation and group work can occur. They vary from meeting rooms, open meeting areas, team rooms, space at workstations, common copier/printer areas, kitchen/coffee areas, circulation areas, and other amenity places, like lounges, etc.

Statement	Strongly Disagree/Disagree/Neutral/Agree/Strongly Agree
There is a good variety of work spaces in this coworking site.	○ ○ ○ ○ ○
There are adequate types of places for different collaboration and meeting needs.	○ ○ ○ ○ ○
I can always find a place to carry out work without distraction when I need it.	○ ○ ○ ○ ○
The size of workstation is reasonable for individual work.	○ ○ ○ ○ ○
The workstations are easy to modify to meet my individual needs.	○ ○ ○ ○ ○
I can always find a place to carry out collaborative work when I need it.	○ ○ ○ ○ ○
I can always find a suitable place for certain types of conversation or collaborative work.	○ ○ ○ ○ ○
There is enough space at a workstation to hold a face-to-face meeting.	○ ○ ○ ○ ○
There are different-sized meeting rooms/spaces on the floor where I am working.	○ ○ ○ ○ ○
There is always a meeting room/space available when I need it.	○ ○ ○ ○ ○
I feel distracted by people's voices from meeting rooms/spaces near workstations.	○ ○ ○ ○ ○
The arrangement and furnishing of the meeting rooms/spaces supports meeting effectiveness.	○ ○ ○ ○ ○
There are adequate tools and technology in meeting rooms/spaces to support effective meetings.	○ ○ ○ ○ ○
I am distracted by people who are talking in common copier/printer areas.	○ ○ ○ ○ ○
I don't want to carry out conversations with colleagues or other members in common copier/printer areas because it will disturb people working in nearby cubicles.	○ ○ ○ ○ ○
The arrangement and furnishing of kitchen/coffee areas support collaborative work there.	○ ○ ○ ○ ○
I am distracted by people talking in kitchen/coffee areas.	○ ○ ○ ○ ○

I don't want to carry out conversations with colleagues in kitchen/coffee areas because it will disturb people working in nearby cubicles. ○ ○ ○ ○ ○

It's possible to carry out conversation in circulation area without standing in people's way. ○ ○ ○ ○ ○

I am distracted by people who are talking in circulation areas. ○ ○ ○ ○ ○

The combination of work spaces in this coworking space supports my collaboration with my business partners. ○ ○ ○ ○ ○

Please tell us your preferred place(s) to carry out conversation and collaborative work in this coworking space. (Please check all that apply.)

For casual conversations:

- At a workstation
- In meeting rooms
- In open-plan meeting spaces
- At common copier/printer areas or nearby
- At kitchen/coffee areas or nearby
- At circulation areas
- Other. Please indicate \_\_\_\_\_

For collaborative work:

- At a workstation
- In meeting rooms
- In open-plan meeting spaces
- At common copier/printer areas or nearby
- At kitchen/coffee areas or nearby
- At circulation areas
- Other. Please indicate \_\_\_\_\_

## **Part II. Quality of Collaboration Experience**

Please indicate, to what extent do you agree or disagree with the following statements according to your experience.

When a question asks about “staff members” it refers to the owner, operator, manager, and any other staff who work directly for the coworking site.

When a question asks about “other members” or “other coworking members,” it refers to other users who are members of the coworking space and work there, but do not work for the same company that you do.

When a question asks about “colleagues,” it is referring to other users who work for the same company that you do.

Statement	Strongly Disagree/Disagree/Neutral/Agree/Strongly Agree
I feel well-informed about the current activities in the coworking space.	○ ○ ○ ○ ○
I am always informed in time for any new changes in the coworking space.	○ ○ ○ ○ ○
I have a clear picture of the expertise of other members at the coworking space.	○ ○ ○ ○ ○
I have a clear picture of the expertise of the staff members of the coworking space.	○ ○ ○ ○ ○
I am learning from the staff members of the working space.	○ ○ ○ ○ ○
I am learning from other members at the working space.	○ ○ ○ ○ ○
I am learning from events or classes at the coworking space.	○ ○ ○ ○ ○
I always have the information I need for my work.	○ ○ ○ ○ ○
It is easy to get help from other coworking members for my work.	○ ○ ○ ○ ○
It is easy to get help from staff members for my work.	○ ○ ○ ○ ○
There is a strong line of trust between other coworking members and me.	○ ○ ○ ○ ○
There is a strong line of trust between staff members and me.	○ ○ ○ ○ ○
I have strong commitment to being a member of this coworking space.	○ ○ ○ ○ ○
It is easy for me to communicate face-to-face with other coworking members.	○ ○ ○ ○ ○
It is easy for me to communicate face-to-face with staff members.	○ ○ ○ ○ ○
I exchange information/ideas frequently with other coworking members through face-to-face communication.	○ ○ ○ ○ ○
I exchange information/ideas frequently with staff members through face-to-face communication.	○ ○ ○ ○ ○
Collaboration is highly valued in this coworking space.	○ ○ ○ ○ ○

I always accomplish my individual tasks efficiently. ○ ○ ○ ○ ○

I feel that working here is beneficial to the development of my business/company. ○ ○ ○ ○ ○

I have made valuable business connections while working here. ○ ○ ○ ○ ○

### Part III

This part of the survey is intended to better understand your personal values about work. Sometimes people must choose between two things they feel they should do. In these situations they must place more emphasis on one activity over another. Below are pairs of statements which describe activities which people feel they should do. Read each statement carefully, and then place a check next to the statement which you feel you should emphasize more in your work behavior. Of course another person might feel just the opposite – both choices are equally valid.

#### Example:

\_\_\_ Always being in control of your emotions while under stress

X Looking forward to the future with a positive outlook

Please read the following 24 pairs of statements and indicate which one in each pair you feel should receive more emphasis. Some choices will probably be difficult for you, but please do the best you can. Do not leave any questions blank.

1. \_\_\_ Taking care of all loose ends on a job or project

\_\_\_ Being impartial in dealing with others

2. \_\_\_ Taking actions which represent your true feelings

\_\_\_ Trying to avoid hurting other people

3. \_\_\_ Encouraging someone who is having a difficult day

\_\_\_ Considering different points of view before taking action

4. \_\_\_ Speaking your mind even when your views may not be popular

- Working to meet job requirements even when your personal schedule must be rearranged
  
- 5.  Making decisions which are fair to all concerned  
 Expressing your true opinions when asked
  
- 6.  Continuing to work on a problem until it is resolved  
 Trying to help a fellow worker/member through a difficult time
  
- 7.  Trying to help reduce a friend's burden  
 Admitting an error and accepting the consequences
  
- 8.  Being impartial in judging disagreements  
 Helping others on difficult jobs
  
- 9.  Taking on additional tasks to get ahead  
 Admitting to making a mistake rather than covering it up
  
- 10.  Offering help to others when they are having a tough time  
 Doing whatever work is required to advance in your career
  
- 11.  Always being truthful in dealing with others  
 Giving everyone an equal opportunity at work
  
- 12.  Judging people fairly based on their abilities rather than only on their personalities

- \_\_\_ Seeking out all opportunities to learn new skills
  
- 13. \_\_\_ Trying to be helpful to a friend/fellow member at work  
\_\_\_ Being sure that work assignments are fair to everyone
  
- 14. \_\_\_ Refusing to take credit for ideas of others  
\_\_\_ Maintaining the highest standard for your performance
  
- 15. \_\_\_ Being determined to be the best at your work  
\_\_\_ Trying not to hurt a friend's feelings
  
- 16. \_\_\_ Trying to bring about a fair solution to a dispute  
\_\_\_ Admitting responsibility for errors made
  
- 17. \_\_\_ Finishing each job you start even when others do not  
\_\_\_ Making sure that rewards are given in the fairest possible way
  
- 18. \_\_\_ Refusing to tell a lie to make yourself look good  
\_\_\_ Helping fellow members who are worried about things at work
  
- 19. \_\_\_ Trying as hard as you can to learn as much as possible about your job  
\_\_\_ Taking a stand for what you believe in
  
- 20. \_\_\_ Sharing information and ideas which others need to do their job  
\_\_\_ Always setting high performance goals for yourself

21. \_\_\_ Refusing to do something you think is wrong  
\_\_\_ Providing fair treatment for all coworking members
22. \_\_\_ Allowing each coworking member to have an equal chance to get rewards  
\_\_\_ Taking on more responsibility to get ahead in an organization
23. \_\_\_ Correcting others' errors without embarrassing them  
\_\_\_ Holding true to your convictions
24. \_\_\_ Providing fair treatment for each coworking member  
\_\_\_ Lending a helping hand to someone having difficulty

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## **Appendix B: Interview Template**

Bonnie Sanborn

## M.S. Environmental Psychology Thesis – Interview Template

The following is a template for a typical interview to be conducted with participants. Interviews will be open-ended, allowing participants to offer up information they feel is helpful or relevant, and so each interview will vary slightly in its content. Follow-up questions will be asked to clarify participants' responses or obtain further information about a response.

Participants will have already indicated their comfort with video recording, audio recording, and photography in the consent form; each individual's wishes will inform the way in which the interview is recorded. Video-taping will be the default method, using a hand-held camera for the tour and a camera on tripod to record the interview.

Participants who agree to be part of the study will be given the survey, interviewed, audio/video recorded, and photographed when using their work space. Appearing in marketing photos is not a requirement for participating in this study. Participation in the study is voluntary and participants in the study may drop out at any time. No individual information will be shown in any publication; only aggregated results will be reported. Names, e-mails, business names, and other identifiers of participants will be kept on a secured portable hard drive and not distributed.

### **(Begin Interview)**

Thank you for taking the time to meet with me. I wanted to have a brief conversation about how things are going for you in the coworking space, and hear some of your ideas about what works and doesn't work. I'm happy to listen to any ideas or suggestions you have. (Operator name here) will be using all of this feedback to plan for future changes to the space, so your input is very valuable to them. Nothing you say will be reported using your name.

For this interview, I'd like to focus on two things: the physical layout of the space and the interactions you have with other people who are here. If it's OK with you, I will video-tape our interview so that we can talk more easily, without me stopping to take notes and photographs.

Would you please show me around the space? We can start at the entrance, and take five to ten minutes for a brief tour of whatever places you think are interesting or important.

Thanks for the tour! Let's go sit in whichever spot you most enjoy having conversations, and we'll do the rest of the interview there (note which space participant chooses).

**Social Activity:**

When you're here working, do you talk with people outside of your company – like other members, staff members, or guests?

Who have you talked with recently? What kinds of things do you talk about?

Have you met someone – another member, a coworking space staff member, or a guest -- through this space that you have then socialized with elsewhere?

Who was it, and what did you do?

Have you met people through this space that you would consider friends?

Have you ever gotten advice or assistance from other members or staff members?

(follow-up if needed: what advice, how often, who from)

**Physical Setting:**

I'd like to talk a bit about this space compared to other spaces where you've worked or gone to classes. Can you tell me a bit about other places you have worked before coming here?

When comparing this space to previous workspaces, how different or similar would you say this space is?

Can you point out to me the spaces you use most often – once a week or more?

Can you point out to me where you typically do most of your work?

Are there any areas you've never used?

What would you say is the best feature of this workspace, physically?

(follow-up to find out why)

And what is your least favorite physical feature, or the feature that you find most confusing or frustrating and would like to see a change?

(follow-up to find out what frustrates/confuses them or why)

Thanks for sharing all of this with me. Before we end, is there anything else you want to add about working here or interacting with the other members?

**(End Interview)**