Achieving Equilibrium through Coworking: Work-Life Balance in FLOSS through Multiple Spaces and Media Use

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ABSTRACT

Participants in FLOSS (Free/Libre Open Source Software) projects are atypical in their collaborative practices given the high demand for virtual work. Through a study of workers from two organizations working on FLOSS projects we identify the boundaries, in terms of productivity and quality of life, of virtual work and actions workers take in order to find a work-life balance. We found that although workers valued the flexibility of working from home, they had difficulty focusing on their work for sustained time periods and often felt isolated. This motivated them to use coworking spaces – physical spaces used as work space by workers not on the same team or even the same firm – as a critical part of their space ecology. In conjunction with their media ecology – a mix of communication technologies including IRC – the space/media mix allowed them to balance their work and personal lives. We draw implications for better supporting FLOSS and virtual work practices through design of media/space and work practices.

Author Keywords

Virtual work; FLOSS teams; Coworking spaces; Work-Life balance; Media-Space Mix.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Recent decades have been termed the "knowledge economy" [23] where most workers are said to be engaged in knowledge work, "characterized by an emphasis on theoretical knowledge, creativity and use of analytical and social skills" [24, p. 773]. Increasingly, in the knowledge economy jobs are service related and flexible in terms of where they can be accomplished [43]. This trend has only increased with availability of higher data bandwidth, novel devices, and higher acceptance of work flexibility within the workforce. In certain industries, such as software development and engineering, the prevalence of flexible work hours is a norm. This is driven as much by the digital materiality of the infrastructure, which allows for anytime, anyplace work, as by the need to find the right expertise regardless of where it is located. In software development, for instance, it is common place for teams to be spread across locations, often across large distances, and to work across time zones, i.e. be configured as virtual teams [42]. FLOSS projects exemplify this configuration as participants work as members of highly distributed teams.

Increasingly, software products from FLOSS projects are either adopted by larger organizations or spun off to create other projects. In this paper, our focus is on such organizations as workers in these situations have a slightly different work dynamics. They are part of open source projects but are also answerable to their parent organization. To better understand their work practices we conducted an empirical study of two organizations working on FLOSS projects to examine workers' preferences and habits. Our approach was to interview and survey the team members to understand their practices from their perspective. In particular, based on our initial findings, we were interested in better understanding how they achieved a work-life balance given that most participants stated that they usually struggled with that. In the rest of the paper we first review prior work, discuss our research study, present our findings, and end with a discussion.

PRIOR WORK

Empirical research on FLOSS development and projects is growing and has focused on a wide range of issues including team member characteristics, work practices, social processes in teams and FLOSS team performance. Some examples include studies of organizational structures and designs [32-35], computer-supported collaboration [36-37] and social processes [38-39]. As indicated by Crowston et al. [34], scarce research has been conducted on the interaction between external environmental factors with FLOSS project development even though studies do show that many organizational and institutional factors shape participation in FLOSS [44]. This gap in the literature exists when it comes to discussing the implications of virtual work for FLOSS team members and the effects of using a mix of tools on collaborative practices. This paper aims to partially fill this gap in literature by examining the work-life balance of project members in FLOSS organizations

and how they utilize coworking spaces and a mix of media to support their work practices.

Work-Life Balance

The issue of work-life balance has garnered much attention since the early 1990s when 'telework' emerged as a viable alternative to the common presence of the '9-to-5' work schedule. The availability of technology that allowed work to be completed from home resulted in increased attention on the ability of workers to be able to work in a flexible manner. Simultaneously, concern was raised with workers' ability to create boundaries between their work and non-work life and lead a balanced life. "Virtual" offices became common and as early as the late 90s. Studies show that workers appreciated the flexibility this configuration provided as it provided them with better work-life balance. A study of IBM employees [25] found perception of greater productivity, higher morale, increased flexibility and longer work hours due to telework, as well as an equivocal influence on work/life balance and a negative influence on teamwork. An experimental design study found support for productivity, flexibility and work-life balance but not for morale, teamwork and work hours. Consequently, with the adoption of teleworking across firms, many company-wide initiatives came to be designed and implemented. Many firms used the flexible hours as a way to market their firm to new employees and many firms became well known for their initiatives.

Yet, this flexibility is not without its downsides particularly for those workers who avail of telework while also working in highly dispersed teams. For instance most workers who prefer not to utilize their firm assigned office, for personal or business reasons, their home often become the primary place of work. Even workers who are not regular users of telework consider it to be potentially problematic. For instance, in 2007 CDW conducted a survey of over 2000 workers and in their sample 79% of workers employed in the private sector and half of workers employed in the public sector were worried that they will feel isolated if they worked from and will miss human interaction if they were to start telecommuting. Mirchandani [21] identifies the dichotomy whereby working at home is sometimes said to allow individuals to gain a full and successful integration of their paid and family work but at other times the physical proximity of home and work activities accompanying homework is portrayed as the cause of great anxiety and stress. Flexibility doesn't dissipate locational and time zone differences that create natural boundaries across which workers have to work and virtual dispersion also often brings with it challenges such as language, organizational culture, work habits, and lack of impression formation [11]. Thus, flexibility and the efforts to find a better work-life balance can create other barriers to productivity and a better quality of life [20].

Recent literature is raising critical questions about conceptions of work-life balance. The primary criticism of existing research is that it is too narrowly focused on those aspects of non-work that related to family and child-care and that also primarily what are considered to be "women's care" work," In the work-life balance debate, over-work is perceived as the problem. Nevertheless, beyond working time and the provision of flexible working practices to enable child care, there is little in the debate about the need to change work per se. The debate also narrowly perceives "life" equating it with women's care work hence the emphasis again of family-friendly polices [18]. Overall, although workers appreciate the availability of more options, these options also bring additional responsibilities.

Space-Place/Media Mix

By examining collaborative work settings and how information technology shapes the "spaces" and "places" of interaction [3]-[4], researchers have been able to design many innovative collaborative technologies. These technologies have often been designed by appropriating characteristics of the already existing physical world in which work occurs. Reviewing this extensive work that modeled mediated communication spaces in the form of real places – complete with navigational maps – Harrison and Dourish [3] articulated an analytical distinction between a "space" and a "place" to propose that a "space" is a geometrical arrangement that structures, constrains, and enables certain forms of movement and interaction. Whereas, a "place" refers to ways in which settings acquire recognizable and persistent social meaning. In other words, "space is the opportunity; place is the (understood) reality (p. 67)." In a review of this work ten years later, Dourish [5] revisits the concept of space in light of recent advances in information technology such mobile technologies and argues that space is a social product "every bit as much as place (p. 300)." He goes on to propose that, "we need to understand, first, something of the relationship between spatiality and practices, and, second, how multiple spatialities might intersect (p. 301)." Introduction of technology, in his view, does not simple create new opportunities for sociality or new places, but transforms the opportunities for developing new spatialities. According to him, "What we need to understand, then, is how spatiality arises, and the role that technology plays in these practices (p. 301)." Reflecting on the relationship between space and place he [5] argues that (p. 304), *The technology mediated world does not stand apart from the physical world…[t]echnology mediation supports and conditions the emergence of new cultural practices."*

With increase in the proliferation of mobile devices and ever more digitization of work practices and ways of communicating, the spaces and places available for work are multiplying even giving rise to what has often been referred to in the literature as nomadic practices [6] – working on the go from wherever it is convenient – thereby further increasing the possibilities of creating new spatialities but also increasing the challenges that come with the creation of any new work practice. To further

examine the issue of spatialities, it is important to discuss the overall ecology of media and spaces available to virtual workers [26-28]. Increasingly, multiple media choices, including social media options, are now common among global virtual workers and most workers learn to use their choice strategically [27-28]. Furthermore, Turner et al. [26] argue that complexities exhibited in the evolution of communication ecologies are numerous – tools work in concert rather than alone, users move fluidly between tools to satisfy their communication needs, they take into consideration the state of the communication partner, and so on. One of the key elements of the mix is social awareness of others in the organization. This need goes beyond just being aware of others but more towards "conscious feeling of belonging, relatedness, and care prompted by the environment [17]."

Coworking Spaces

In recent years, one of ways in which the rise of telework and then virtual work has introduced "spatialities" is through the emergence of collaborative workspaces called coworking spaces. Coworking, a shared space typology, began in the 2000s and has rapidly spread across the world over the past decade. Coworking-spaces offer office and social space for temporary or long-term use according to availability (e.g. a cafe´) for its users [2]. They are characterized by co-presence [19], resource sharing and community building [1]. Coworking spaces are oriented toward providing service, not just a physical space. For the most part, space operators and 'members' subscribe to a set of shared valued: collaboration, openness, community, accessibility, and sustainability. According to Johns & Gratton [40 p.6], "Coworking spaces are to knowledge work what bike-share programs are to personal transportation: a community-based, low-cost, convenient, and ecofriendly solution."

There are limited empirical studies of coworking and in one of the few field studies of coworking, Spinuzzi [19], reported that participants in his sample, 17 people, primarily small-business owners and consultants, had all tried working from home, and 14 of the 17 reported working from coffee shops. The study participants were unsatisfied with both working from home and coffee shops and reported that they experienced distractions, were unable to motivate themselves to work, and also felt isolated. The participants reported issues like taking conference calls in a parked car to avoid the dogs' bark from disturbing, and being distracted by domestic chores such as washing dishes and doing laundry. One participant reported getting depressed because they didn't have anyone to talk to. Others complained that working from coffee shops meant feeling obligated to buying coffee and buying food and also not have a silent space to work.

According to Brad Neuberg [30], who is credited with coining the term coworking, coworking's diffusion derives from an open-source ethos. In his write-up Neuberg recalls

saying [30], "'Take this idea, steal it, and make it your own"; basically I was giving people permission to take coworking and remix it, just like the open-source roots I came from'." It is hard to say if our study participants were aware of this or not, by this trend of using coworking spaces was mentioned by some research participants during the initial negotiations for access to research sites and emerged more fully again during interviews at the field study stage. We delved further into the issue of space/place and media mix to better understand how virtual workers leveraged different options available to them and why.

RESEARCH STUDY

Data for this study were collected through field studies of two firms that worked on both proprietary and FLOSS projects. The first site was a large software and hardware technology organization, 'Digitech,' with a presence in all major markets of the world and development centers across Asia, Europe, and North America. The firm had recently released an open source version of their software and our field study focused on the team working on that software The field study was spread over 6 months and included interviews with 41 participants and observations on three different occasions at two different locations; US and Ireland. Most interviews were done face-to-face and some occurred over the phone. Overall, the participants who were interviewed worked as members of distributed teams and lived across different states in the U.S., including California, Pennsylvania, Colorado, and Oregon; and across different countries including Ireland, United Kingdom, France and Japan. This firm was selected as it was well recognized as one of the leaders providing in flexible/telework options for its workers. Digitech also had a flexible office space program where employees could just book a space within the office building to work from if they planned on coming to office rather than have a permanently assigned office. In addition to software developers, we interviewed managers, and those in administrative roles.

Function	Location		Gender	
	Americas	Europe	Male	Female
Director	2	3	5	0
Manager	4	5	6	3
Engineer	12	12	24	0
Admin	1	1	0	2
Intern	0	1	1	0
Total (41)	19	22	6	5

Table 1: Geographical Location and Gender of Interview Participants – Digitech

The second site of study, "RAPID", was a web development firm with around 50 full-time employees and 5-10 contractors. Although it had a physical headquarter on the U.S. West Coast, most of its employees were distributed across North America, Europe and Asia. RAPID has developed and maintains an open source blogging platform and also provides supports and services for a paid version of the software. At RAPID interviews were conducted with

6 participants. In both studies semi-structured protocols were used for the interviews and interviews ranged in length from 35 minutes to 120 minutes. Table 2 provides details on the functional roles of participants and their preferred form of media. All the interviewed participants reported using blogs as the preferred media [29].

Participants	Function	Preferred Media
Brian	Support/Designer	Blogs, IRC
Alan	Designer/Developer	Blogs, IRC
Sarah	Admin	Email, Blogs
Janet	Editor	Blogs, Email
Michael	Support/Developer	IRC, Blogs

Table 2: Functions and Preferred Media of Interview Participants – RAPID

All interviews were transcribed by a professional transcriptionist and then proofed for any errors by the researchers. The interviews consisted of a series of open-ended questions about participants' background, tenure with the firm, nature of work, team composition, use of technology, and collaborative experiences. Critical incidents mentioned during the interview were probed further. Triangulation was done by interviewing multiple members of the same team where possible. The data collection process allows us to make accurate comparisons and contrasts of practices across teams and allow for a better understanding of work practices adopted by participating teams. We paid particular attention to understand not just the explicit but also the tacit aspects of work. Following Strauss's open coding technique [9], the two researchers analyzed interview data through an iterative grounded analysis process to identify salient themes. NVivo 7 software was used for coding and analysis. All interviews were read and free coded to capture the primary analytical categories. The overall goal of the initial phase of data analysis was to identify themes that emerged from the data. Once a certain number of themes started to reappear in different interviews, they were grouped under broader themes (categorical coding) that included use of technology, work-life balance, managerial practices, open source experience, and so on. If needed, participants were contacted for clarification and to assess if data interpretation were correct. The topic addressed in this paper, the use of coworking spaces and the attempt to find work-life balance was one of the recurring themes that emerged naturally from the data.

At RAPID, in a second phase of data collection, a survey was administered with 25 respondents for further data triangulation (Table 3). The survey was distributed on-site in paper format and then the data was entered in a spreadsheet for descriptive statistical analysis that includes counting, averaging and calculating the standard deviation. Due to internal limits to employee access, we were unable to collect survey data at Digitech. The complete interview protocol and survey instrument are available from the authors.

Function	Location			Gender	
	Americas	Europe	Asia	Male	Female
Developer (11)	8	3	0	11	0
Support (8)	4	3	1	7	1
Others (5)	5	0	0	2	3
Total (24)	17	6	1	20	4

Table 3: Geographical Location and Gender of Survey Respondents – RAPID

FINDINGS

The findings from our study show that new spaces and places emerged or were constructed largely in part as a response to the need of balancing work and life. FLOSS teams were often spread across time zones and therefore workers found that they had to find ways to re-balance how they spent time on work given the necessity to accommodate different time zones in their work practices. This was true of workers that had assigned offices within the firm as well as those who were 'virtual' and did not have an officially assigned physical space. Consequently, a space in the house was one of the first ones to be constructed. Over time working from home became problematic for most workers because of frequent interruptions and a feeling of isolation. This resulted in the need to find other spaces. Workers who had an assigned space at the office frequented that space but if that was a not a workable solution the use of coworking spaces emerged. We now discuss these findings in detail.

Working from Home

At Digitech, many participants reported that being able to work on teams that were spread globally allowed forced them find a better work-life balance and they approached it as a lifestyle choice which allowed them to work from home. Many workers also seized the opportunity to move to attractive geographic locations for personal reasons. For instance, when we asked one worker who worked from New Zealand as part of a team based in Ireland, why he moved to New Zealand he said,

"For myself, I think it's the balance between your private life and your work. I can work in the day or I can work in the evening...take a break in the middle of the day. I can't do that if I was working in the office. For me, that's probably the most important – balancing life and work. For Digitech, I think, it's probably also important the employees are not stressed."

Another developer in the Ireland office who worked from home four days a week cited personal and commute reasons for working from home,

"I am originally from [a city north of the office location] and my wife is a lecturer there. When we got married we bought a house somewhere in the middle. She goes that way and I come this way. Initially it was a concern [working

from home] but I talked to my manager and since then we've had a lot more people start working from home."

Similarly, another worker in the U.S. location mentioned that flexible work hours had given him considerable work-life balance and he was able to use the opportunity to work from home productively and was cognizant of the need to keep his team aware of his presence or absence:

"I have extremely varied schedule. So typically, I get up, log on and check e-mail. Mostly it is just monitoring and making sure everything is okay and then sort of marking a handful of messages for things that I need to follow up on. Sometimes I have enough time to do that follow up before taking the kids to school. Sometimes I don't. If I do, then I do it, if I don't, then I deal it when I get back from taking the kids to school. Then, often I will take a break in the late morning and go for a bike ride for below one hour. Other days, my work out is over lunch and I go for a run or go for a Frisbee. My team they always aware when I will be gone and I generally say, 'Okay, I am going doing X now I will be back in N hours.' And I can set my IRC so they will know when I will get back. Then when I get back I catch up with whatever I miss, I go through the same thing."

Flexibility in work was well supported by the management at this U.S. location. Many employees did not have offices – as they worked mostly from home – but when they needed to come to the office they could book one of the "flexible office" spaces. Engineers in locations other than the U.S. headquarters preferred the option to work from home as well, as this engineer on the East Coast of the U.S. said,

"I work from home. There is a small office here [in this location] but it ends up working better for me to work from home because I have my work station and all my reference materials there at home than in the office."

In addition to better work-life balance, several participants mentioned that incorporating working from home in their work ecology actually made them more productive and efficient,

"My impression is that I can be more productive working from home that working from the office. I probably also work for more hours than if I was working in the office. So when I in the office, I was interrupted very often."

During the interviews, the issue of working from home emerged quite frequently and participants regularly described the nature of their home arrangements. For instance, when the first author was waiting to interview a participant at Digitech, another participant who was scheduled for later popped in and said that he is happy to "go now" if needed. He then proceeded to tell that he always kept his schedule flexible as that helps him better spend the day. He liked spending time with family, had to drop-off or pick-up the kids from school, and therefore worked around their schedule.

The option to work from home was not only beneficial to the employees but also to the firms – giving workers the opportunity to work from home or from cities of their choice resulted in very low turnover. This allowed the firms to keep its expertise in-house, especially in the highly volatile IT market, and maintain the core engineering prowess for which they were renowned. Many of the employees, and in case of RAPID most of them, were recruited through the open source community that worked on the product.

At RAPID, most participants reported that they worked from home as the firm was formed as a virtual firm with a physical office rented for the sole purpose of having an address that could be reported to clients and for legal purposes. This was their understanding from the start of their job with the firm. In order to facilitate transition to a firm that was completely 'virtual,' RAPID had developed a series of hiring and socialization practices. They ensured that newcomers experienced virtual work first-hand before committing to working for the firm. New employees made their formal entry into RAPID by starting a blog or linking their existing blog with the company system. Later, they were given access to an internal product support knowledge repository to familiarize them with the system. RAPID brought the new hires on board through a temporary contract agreement with the promise for fulltime employment if both sides – the employee and the firm – found the relationship productive. This time frame allowed the firm to gradually socialize the newcomer to its norms.

Limits of Working from Home

For the majority of participants who worked from home, the creation of a working space within the home was a critical first step. Participants reported creating workspaces that were separated from areas of communal activities and were given a distinct aura of a work space. To achieve this they either located their office in the attic or on another floor away from the common areas. Their primary explanation for a secluded work arrangement was the need for concentrating on their work so that they could be productive.

"You have to set aside your work space. You have to be committed to spending this amount of time doing your work."

"And the office is up in the attic, I just go up whenever I want to. But I intend to start around 9 o'clock and work through to whatever time I finish. Spend some time with kids in the morning before school. But if there is meeting in the morning, then that goes out the window and we take the meeting. It all depends on the day. Definitely when you are at home, it is much more flexible than how you do things because it much easier to just go up anytime. But I do try to keep a distinction as in this is the office, this is where I am."

Informants often mentioned that their days in the office were full of interruptions that made it hard for them to focus on their tasks thereby increasing their time on tasks. Working from home provided them a way to avoid unnecessary interruptions. A secluded space provided the ability to focus on tasks and reach out to co-workers through electronic means when needed. One participant, whose wife also worked from home, reported that they got so absorbed with their work that they often started treating each other as virtual coworkers:

"And yet we both, maybe she is downstairs and I am upstairs, and I will end up sending her an e-mail message or an MSN message or something to ask her if she wants to have a cup of coffee. So, it is kind of funny we hardly see each other during the day. We are both fairly dedicated to working with that."

Problems of interruption were reflected even during the data collection for the study. During several interviews we could hear the participants talking to their other people and at least a couple of the participants commented that they were sorry for the interruption but that this was unavoidable and quite common as they small children or their spouses/partners also worked from home. They used the interruption as a 'teaching moment' to say that this is exactly what they were talking about when they said that they were interrupted often. Although most workers talked positively about their ability to work from home and the flexibility this afforded them, a theme emerged around the discord this created in their work experience. Participants reported that over time they started feeling a sense of isolation from this work arrangement.

"I am not sure if I will be happy working remotely on a full time basis for that day that long. You get a bit isolated and which I think is a bad thing."

"Alone in there with (the) computer and I couldn't see anybody talk with anyone in the office. So, sometimes this sort of thing is to be there. I think that after a while I was trying going to an Internet café and working from there for one or two hours per day just to see people."

Over time, the insular nature of the home office increased the desire of workers to be able to connect with other people – be they coworkers or not – increased.

"As far as, you know, how I found it, I have found that I do need a little bit more human contact with people who are designers. Obviously, I have a wife and kids, and now that it's summertime they're at home a lot. And actually that helps me to, is get out of the house. Because they're, they're kind of around, and they can be (laughs) they can be kids. And so I have needed to really get out sometimes and just. But there are days when I just go to a coffee shop and I sit there for eight hours and focus on my own stuff."

Use of Coworking Spaces

The problems of interruption and isolation motivated workers to seek other alternatives to support working from home. Some workers, those who had assigned office spaces or had the option to use a flexible space at work, weaved that option into their work practices. For others this was not an option due to the virtual nature of their firm or significant distance of the office from home and they moved to work from coworking spaces – common spaces used by workers belonging to different firms.

"And, on a day when I have lunch plans, I tend to wrap up things earlier and head about 11 or 11.30 and have lunch. We talk about work and then coffee shop. On a day like today when I am at home, I am knocked down at home. On those other days, I usually go to a coffee shop and work and get to do things till 4 o clock and do the other preloaded things and usually by 4 or 5 o clock, I usually make my next round of blog posts."

These spaces are sometimes used by coworkers from the same firm if they live in physical proximity but are commonly occupied by people who seldom know each other. In some instance, they are used by friends or ex-colleagues who can contribute indirectly to the advancement of work tasks. This manner of work practice is highlighted by one participant:

"I started with one of my friends. Just the company I worked for and he now works for company called (ABC); and so we meet three to four times a week. We are working at home, we meet for lunch and then either we go home or I started working out of a coffee shop together… As far as, you know, how I found it, I have found that I do need a little bit more human contact with people who are designers."

The popularity of coworking spaces, particularly working from coffee shops, was evident in the interviews as participants commented on coworking habits of their coworkers:

"We have an engineer who is in Chicago, one of our team mates, and I hardly talk to him on IRC or on the phone but we talk more on email. He also works from home and in fact he told me he actually opened an account in Starbucks since he works so much from there."

The flexibility of working from home the advantages it provides as well as the problems that emerge are captured in this quote from RAPID employee who works virtually:

"I've I really enjoyed kind of the freedom of being able to wake up kind of when I feel like it that helps my day go better; I found that at the end I can really start to answer questions and solve problems a lot better than when I don't feel rushed we have an office and everybody needs to be here at the same time kind of rules. I have found a really strong need to meet people for lunch so I might work from ten to noon and then actually two to three days a week I meet people for lunch. We are working at home, we meet

for lunch and then either we go home or I started working out of a coffee shop together.”

Our findings indicate that coworking spaces can also complement many facets of virtual work. In several instances, our participants reported that coworking enhanced their knowledge of the local economy as well as job and growth opportunities available in the area. In some ways, the “strength of weak ties” [10] phenomenon was evident as co-workers were from different organizations. Several participants in junior roles expressed that learning opportunities are not readily available at the workplace because senior engineers chose to mainly work from home. Therefore, they were, in some ways, forced to co-work to grow their knowledge network beyond that available online. Furthermore, with coworking gaining increased prominence and acceptance they substituted part of their online interaction with co-workers by face-to-face interaction – they invited selected people to co-work with them. Workers also invited people from other organizations, for instance someone from the open source community in which they participated, to their coworking spaces thereby gained new opportunities to network and share knowledge as there were no organizational restrictions. Through coworking, tacit knowledge was shared experiences are transferred and communicated in a way that can help new employees gain a fast track towards expertise [41], avoiding the barrier that forms due to geographic dispersion [11].

Media Mix
Finally, our study uncovered that not surprisingly virtual work was inherently support by the use of different media for communication and collaboration. This multiplicity of media afforded being able to connect to coworkers in more ways but even more critically it allowed workers leverage media for specific purposes. Phone conversations were useful as they allowed synchronous communication and allowed reduction in turnaround time. They also facilitated quick updates that put everyone on common ground immediately. Email was considered good for non-critical communication but that needed to be stored long term. Of all media available the use of IRC was the highest, at least at RAPID and to some degree at Digitech, as IRC often substituted for hallway chatter and informal:

“That’s what our guys do, they hang out in the IRC channel. But I actually think it is important… There is some kind of initial socialization that is quite important that we try and have people work here for. We’ve kind of almost involved a lot of people who are working remotely from the site and maybe not coming into the office every day. We try and make sure that we build social interaction into what we do.”

“I think IRC, for people who work from home, IRC is almost a way of just keeping in touch with everybody, you know, and feeling that you’re still part of the team, you’re still part of the group because when you’re on IRC, you can see that this person is logged-in and this person’s working.

So you know that they’re around. I know the engineers who work from home, they’re on IRC all the time. It’s just they’re in the background [and feels like] all the people are sitting near you. You know, that way.”

Our survey data collected at RAPID was able to shed more light on the use of media by workers. Workers reported that they frequently used four communication technologies: Blogs, IRC, Skype and Email. Blogs were the most frequently used, followed closely by IRC. Email was least frequently used and some respondents used it only on a weekly basis. 84% used blogs and 70% user IRC hourly or few times a day. When asked to rate the usefulness of media, Blogs, once again, were reported as the most useful (65%) followed closely by IRC (50%). Skype was also reported as useful by a majority of respondents and only 11% found email extremely useful for work. Finally, when asked for s their personal preference for each medium over other media, Blogs and IRC, once again, were by far the most preferred communication tools with IRC garnering stronger affiliation by some respondents even compared to blogs. Email was the least preferred communication tool as compared to the other options available to workers.

The use of IRC by workers in many ways resembles the newer forms of collaborative platforms such as Slack™ that are not becoming popular within firms. Similar to the affordance of IRC to bring everything about work to the same platform and allow workers to monitor and/or participate, a service like Slack does the same thing. It allows work and social interactions but also allows links to documents, pieces of code, and other pertinent information in the same workspace. In some ways this can be seen as an indicator of how things have changed in the knowledge economy where the flow of information is extremely high and channels such as email or phone are just not suitable anymore to keep abreast of all relevant information and therefore some form of continuous browsing and filtering by coworkers is essential for productivity. Such channels also, of course, provide those not in the same physical setting access to information as well. And as one participant commented, they allow for preserving information so that it is available post-hoc:

“One of the key things is communication. You have to document and communicate with your people… When you are working remotely, different time zones and different countries, you need to document. It needs to be written down, so that finding things becomes easy.”

One of the concerns we had in terms of the research study was trying to ascertain how well the virtual configuration worked. Response to interview questions all yielded positive results and since most workers had self-selected to respond to the study call, they expressed a positive sentiment about virtual work.

To further investigate this issue in the survey administered to respondents at RAPID (see Figure 1), we included four

items that asked questions related to work practices of workers: "I feel like I'm on the same team as my co-workers," "My co-workers provide timely information about changes in current plans," "I feel comfortable sharing ideas and feelings about work with my co-workers," and, "Overall, I feel like my coworkers are trustworthy." The overall response rate shows that there was a strong feeling of being on the same team (65% either strongly agreed/agreed), information sharing was timely (57% either strongly agreed/agreed) and workers felt comfortable sharing information (77% either strongly agreed/agreed), and, finally, the level of trust among coworkers was self-reported to be extremely high (88% either strongly agreed/agreed). In addition, almost every respondent either agreed or strongly agreed that they are comfortable sharing their ideas with co-workers through blogs (88%). Finally, 70% of respondents reported that they did not have any difficulty finding people with the right expertise. So, overall, the work configuration appeared to be working for the firm.

Figure 1: Coworker Relationship & Information Sharing
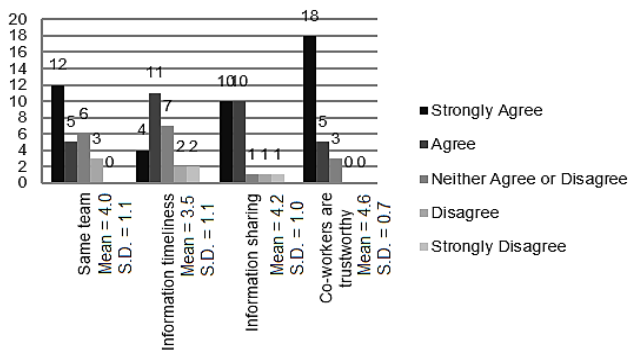
DISCUSSION

The findings from our field studies show that working on FLOSS teams significantly shifted the work-life balance of participants and to rebalance their lives they started to develop practices that would allow them to be more flexible with their time. A first instantiation of this was the expansion of their work ecology to include their home. The design of work spaces within home and the integration of technology within that space are important and a common part of the work ecology [12]. A further expansion of the work ecology to integrate coworking spaces emerged as working from home proved inefficient and isolating. The decision to meet at coworking spaces was driven by the need to increase the productivity by either working in a space that is conducive to do focused work with other workers with similar intentions. In addition to home office and corporate office, coworking spaces offered an extended outlet to achieve continuity in their work activities.

Our findings suggest that FLOSS workers undergo a blended configuration for virtual work whereby they utilize multiple media mix to support their work practices and the spread of work activities between working at home and co-

working spaces. In both the cases we present, FLOSS workers had to manage two aspects of work practices – working internally within the firm and working with the external FLOSS community. They reiterated the community aspect of FLOSS work versus their more traditional organizational dependencies. From a virtual work perspective, building trust was often more crucial in their open source community participation. The participants mentioned that the use of IRC was something that came from their OSS participations and they also learned the value of having more eyes on their code that comes with being part of OSS. They also reiterated the need to document more and be more communicative as something that emerged from the OSS participation.

Our field work informs us that coworking spaces are no longer merely spaces for workers to meet up for a short burst of productive work. Rather, we found that workers exploit coworking opportunities to complement their working styles and add value to their professional work. Hence, researchers have opportunities to focus on issues that come with triply linked work environments and the implications for the individual worker. Other than the workplace and the home office, researchers may have to make additional considerations of the coworking spaces where virtual work and even mobile and nomadic work are no longer done in short bursts. No longer bounded to either the office or the home, co-workers can switch work spaces to whatever suits them and wherever that can help them complete the most amount of work. With the involvement of other workers who can play a beneficial and complementary role, coworking spaces offer face-to-face interaction and social capital that nomadic workers might lack.

Finally, the move from home to coworking and increasingly to nomadic work illustrates the frequent shifts in media use. In this scenario, the mix of media/spaces is dynamic and more akin to a blend, especially if work is to be accomplished smoothly. This suggests that the notion of "work-life balance", which suggests that something is off and needs to be brought back in sync, is in many ways a misnomer. Increasingly, what is critical is not finding balance, whatever that is, but ensuring that an appropriate media/space blend is available for virtual work. As Pongolini et al. [30] found in their study of a community of technology experts within a global automotive manufacturing company, work practices characterize media choices made in virtual teamwork. Practitioners add new media to ongoing interactions, and one medium is not used exclusively but a number of media are used in parallel. Their work is supported by the findings from this study and supports their argument that some fundamental assumptions built into the concept of media choice theories are problematic when seen from the perspective of virtual teams in real world settings.

Overall, this paper addresses the gaps in the literature pertaining to the implications and impact of environmental changes on the work-life balance and work practices of FLOSS project members. This paper has three key findings: 1) members in FLOSS projects undergo a blended configuration to support a spread of activities across work and beyond work, 2) FLOSS workers engage in a mix use of media/spaces with the main goal of supporting work completion and correcting disruptions to their work and 3) coworking spaces are no not merely spaces for brief social encounters but are avenues for productive FLOSS practices.

Implications for Design

The findings from this study have several implications for design and implementation of spatialities for virtual working. We see that in technology-enhanced workplaces workers commonly repurpose not just tools but also spaces to improve their work practices. Therefore, designers should not only be cognizant that their designs will be repurposed but they should design objects and environments so that they are malleable and, as Kaptelinin & Bannon [13] argue capable of "helping people themselves create better environments for their work, learning, and leisure activities." From a ubiquitous computing perspective as well, as Aipperspach et al. [16] suggest, the variation in technological and spatial complexity should acknowledge the relationship between the virtual and physical spaces we inhabit and gives people choices, "Rather than containing one "right" space for every activity, the heterogeneous home enables people to create separate experiences by reconfiguring and exploring different aspects of the domestic environment (pg. 230)." Extrapolating this, workers need diverse media/place blended environments each appropriate for a specific task.

This study through its findings around coworking emphasizes an oft overlooked aspect of how technology shapes practices – it facilitates a better work-life balance but at the same time creates a situation where interruptions become common and workers feel isolated. This study raises questions about how technology designed to be repurposed can result in better practices as opposed to creating conditions that lead to breakdown in collaborative work. This study also supports the guidelines for the design of place-oriented systems outlined in [14]. Harrison & Tatar [14] argue that designers have to contend with the semantic tangle of people, events and loci or the meaning making that occurs in embodied and active interaction. As the case study presented in this paper shows, selecting spaces to work from itself is an act of meaning making – redesign of work ecology itself becomes a sensemaking activity for virtual workers. Coworking also has a lot of implications for the design of corporate offices [15].

There are several limitations of our work. In order to substantiate our views, there is a need to investigate the additional work processes that are created as a result of working outside the office and home work spaces. The examination of the work activities and processes occurring in virtual work performed in the coworking spaces will further uncover how virtual work has been changed and the characteristics that define a coworking "place". Another critical limitation of our research is that we do no examine coworking spaces directly but rely on participants' self-reported account and this lapse presents an exciting avenue for future research. Finally, the two empirical studies are inconsistent in that we only have survey data from one of the sites.

CONCLUSION

In this paper we present findings from a study of two firms working on FLOSS projects to better understand how workers achieve equilibrium of sorts between their work and personal lives. Our analysis shows that workers engaged in working from home as it provided flexibility but felt isolated or very unable to concentrate on work and ended up using coworking spaces to find an equilibrium that worked. The use of different communication channels helped with the use of different spaces. Our work, in addition to better illuminating the lives of FLOSS workers, who largely work virtually, also sheds lights on the continuous interplay between work and life and the role of technology in that process.

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