EPIC
Ethnographic Praxis in Industry Conference

RENEWING WORKPLACES/ORGANIZATIONS

Back to the Future of Work: Informing corporate renewal

JENNIFER WATTS-ENGLERT
Xerox Innovation Group

MARGARET SZYMANSKI
Palo Alto Research Center

PATRICIA WALL
Xerox Innovation Group

MARY ANN SPRAGUE
Xerox Innovation Group

BRINDA DALAL
Dhoopa Ventures, LLC.

This paper describes the results of a multi-year ethnographic study of how knowledge workers integrate new technology into their work practices. We studied mobile and remote workers who use smartphones, tablets, cloud computing, and social networking to support their work. Study findings describe the characteristics of mobile work, the coordination of multiple devices and sources of information, how new technology functioned as a social resource and issues that arose when participants used personal mobile devices to support work. We will also discuss how we are working with corporate teams to renew our research projects, and the solutions and services the company offers to support the changing nature of work.

INTRODUCTION

The world of knowledge work is changing rapidly. New technology like mobile devices and cloud computing allow people to work anytime, from almost anywhere. Work takes place across globally distributed teams, who co-create complex, interconnected webs of dynamic information. Work and personal life continue to blur, especially as people begin to use personally owned devices, like tablets and smartphones, to support work. The convergence of these trends is creating significant changes in how work gets done (Meerwarth et al., 2009).

Our team conducted studies in 2008, 2009 and 2011 to explore the impact of these changes on the nature of work. Using an ethnographic approach, the team conducted in-context interviews and observations of people who engage in mobile and remote work, and use cutting edge technology like smartphones, tablets, cloud computing, and social networking to support their work. This paper builds on our 2009 EPIC paper (which presented the findings from our 2008 study) to share what we have learned in our 2009 and 2011 studies.

We first describe the characteristics of mobile work, and then discuss how participants integrated new technology like mobile devices, as well as multi-media like video and images, into their everyday

EPIC 2012 Proceedings, pp. 150-162, ISBN 13: 978-0-9826767-7-6.

work practices. We describe how participants coordinated multiple devices and sources of information, how these new devices replaced everyday things in the lives of participants, and how the new technology functioned as a social resource. We also discuss how the consumerization of IT (where knowledge workers use their personal devices to support work) affects issues like information security and shared account management.

Finally, we describe how we incorporated study findings into UI concepts and experiential prototypes - to set a vision for the future of our company, and how we are working with corporate teams to renew our research projects, and the solutions and services we offer, to support the changing nature of work.

BACKGROUND

In looking back at our 2009 EPIC paper (Watts-Perotti et al, 2009), we find that many of the trends noted from 2008 have continued. For example, the mobile worker population (defined as those who worked outside a static office for more than 30% of their time) continues to increase. In 1998, the worldwide mobile worker population was 919.4 million (Llamas & Stofega, 2011). This number is expected to increase to 1.3 billion by 2015, (Keitt et al., 2011). The number of US telecommuters also continues to increase. In 2000, 4.2 million people in the US worked from home at least part of the time. This number is expected to increase to 63 million by 2016 (CNBC.com). Additionally, smartphone sales continue to skyrocket. In 2008, 151.1 million smartphones were shipped globally (businesswire.com). IDC reports that the number of smartphone shipments jumped to 472 million in 2011, and will double to 982 million by 2015 (Llamas & Stofega, 2011).

A few new trends have emerged since our paper in 2009. For example, in addition to smartphone sales, companies have begun tracking tablet sales, which have continued to increase. In 2010, 17.8 million tablets were shipped globally. This is projected to increase to 135.1 million tablets by 2015 (Llamas & Stofega, 2011). Business research companies have also begun to note that many employees are using personal mobile devices to support work. Ipass claims that 87 percent of mobile workers who own tablets use their tablets for at least some work (ipass.com). This trend presents new complexities for IT departments, who must now manage confidential enterprise information across multiple mobile devices and platforms.

METHODOLOGY

In our 2009 and 2011 studies, we used a combination of interviews and observations to gain a deeper understanding of how work was changing for participants located in the San Francisco Bay area and the Rochester, New York area. In both studies, we conducted open ended interviews with each participant and shadowed them for a full work day. We followed them wherever they did their work, including riding with them in their cars and shadowing their meetings and other activities throughout the day. We audio and videotaped the interviews and observations, and subsequently transcribed them for analysis.

In 2009, our study focused specifically on mobile workers and involved 17 participants who worked outside a static office for at least 30% of their time (many were mobile for closer to 80% of their work time). They all used smart phones and received company or work email on these phones.

RENEWING WORKPLACES / ORGANIZATIONS

Participants worked in a wide range of jobs including sales, design, rental properties, consulting, and startups.

Our 2011 study targeted participants that worked for small to medium sized businesses (5-500 people). We conducted 14 in context interviews at the location where the participant did a majority of their work (often a coffee shop or other transient meeting or work space). In addition to the interviews, we also observed 8 of the 14 participants for a full day of work. All participants in this study used smartphones, tablet computers (like iPads), cloud computing, and social media to support their work. They represented a mix of ages and a variety of job titles including educator, business owner, services supervisor, rental property manager, researcher, and student.

SUMMARY OF KEY FINDINGS

Our comparison of the findings from our series of studies revealed a rich set of trends concerning the future of mobile work. Here we discuss four main themes: 1) how effectively accomplishing mobile work is an art; 2) how workers are continuing to push the limits of mobile device integration in their work and everyday life; 3) how technology is a resource for social connectedness; and 4) how personal mobile device ownership and community sharing is revolutionizing work place practices.

Mobile work remains more of an art than a science

While technology makes it easier to work anytime, anywhere, we found that effective mobile workers must proactively develop strategies to handle infrastructure shortcomings and technological deficiencies. For example, some carried duplicate cords, batteries, and other hardware in travel bags that were always packed and ready to go (See Figure 1).

FIGURE 1. Participants carried backup cords for laptop power.

Like our 2009 study, participants continued to strategically configure their devices in parallel to maximize their work process. In order to increase their screen real estate, participants usually set up the tablet computer next to a laptop, not to share these screens but rather to coordinate the work on the laptop (See Figure 2). The tablet or smart phone provided a type of status display showing incoming information (i.e.: email or other kinds of messages), as illustrated by this quote "Usually (my iPad) is just watching the mail in case there's something more important to interrupt (my work)." Other types of device coordination included the use of tablets to look up information while

participants were using their phone for voice calls, and using the phone to access the internet if the tablet did not have access to Wi-Fi.

FIGURE 2. Participants often used their mobile devices in parallel.

In addition to organizing their tools, mobile workers orient to a situatedness (Wertsch, 1985) of their information to facilitate their work. As many participants interacted with multiple people with varying backgrounds and roles throughout the day, they required flexible views into their contact lists that supported the task at hand. For example, to support conference calls with client groups, one participant manually constructed an overview spreadsheet that listed attendee names and roles within the company; this view into client information was not available in her electronic contact list. Another participant, a real estate owner, bundled his contacts around specific rental properties to facilitate project based tasks: "Here are the names of my colleagues (related to a specific project). They're all in there together. If I was trying to reach one, and couldn't get one, I would go down to the next person. They would all be in one file instead of having to jump all over the place."

Due to the variable nature of mobile work, which features multiple meetings and travel that disrupt the flow of their work, participants use communication media and their physical location to re-prioritize their work throughout the day. For example, participants made an explicit effort to check their email, voicemail, and text messages between meetings to reorient to their work and to update the status of tasks that needed attention; this allowed them to reprioritize their to-do lists if new, more important tasks emerged while they were engaged with their meeting.

Participants also use their location, surroundings and amount of available time to re-orient and situationally re-prioritize their work. So if a meeting ends early, participants may take advantage of their location to run errands at nearby businesses. In another case, when a landscape designer happened to stop for gas near his main office, he decided to take advantage of his location and call the office to see if new work had come in. Since there was a new project, he stopped by the office to pick up paperwork after finishing at the gas station, thereby changing the set of tasks he was responsible for throughout the rest of the day.

Mobile work magnifies the fluid, organic nature of work. In the micro moments that occur throughout the day, people are presented with small moments of free time to check email messages at a stop light, or while walking down the hall. In waiting rooms and during meals, they also used their mobile devices to read articles or access information (See Figure 3). Participants considered these new

behaviors to be very productive and many commented that the ability to keep up with their incoming messages throughout the day allowed them more free time later in the day. However, while mobile technology can increase productivity, it can also make it difficult to maintain a balanced life. Several participants commented that they proactively decided to spend time away from their technology. "Everything is digital. It has its perks, but, …sometimes I don't want to be connected. ..I just want to interact (with real people)."'Sundays are no technology (days) for me."

FIGURE 3. This picture shows how one participant spends his breakfast – using his coffee cup to prop up his smartphone, so he can catch up on the research articles he needs to read.

Device Integration across Work and Personal Tasks

Participants' mobile devices became very smoothly integrated into their work and personal lives. Smartphones and tablets were treated as appendages and companions, being carried on the person – in pockets or on belts (rather than being hidden away in bags and brief cases). These devices were often kept next to the bed while participants slept, sometimes acting as books, alarm clocks, televisions, music players, flashlights, etc.. Participants often said these devices were the last things they interacted with in the evening, the first, in the morning. This radical integration of mobile devices is causing the reduction and elimination of everyday objects, forever changing the landscape of our material world.

One way in which we can see how device integration is revolutionizing the way we store and access information is the use of these devices as ad hoc portals into their personal information landscape. For example, one participant stopped carrying printed information with him because his mobile devices would give him access to whatever he needed, at the moment when he needed it. He explained: "I'm sitting in front of the receptionist ... And before she runs out of patience, I've usually found that group number (on my smartphone), and I just show her the phone and say, 'Here. I'm insured."' This participant did not plan ahead, looking at his schedule to determine what kinds of information he would need to carry with him that day, instead he relied on the ability to access whatever he needed with his smartphone.

Technology as social resource

Increasingly mobile devices are being integrated into the social interactions that support people's work and personal lives. Tablets were referred to as talking pieces that people could jointly refer to in conversation; in fact one participant actually bought his tablet to share information with people who attended his booth at a trade show. Mobile devices not only play a role in the conversation, they enrich the conversation by bringing in ad hoc reference resources. One participant, a professor, constantly used his phone or tablet to engage his students by pointing them to information on the internet, or in specific applications (See Figure 4), and another participant, a real estate agent, used her iPad to show her clients available properties that fit their criteria. Because tablets have the ability to display information in engaging, multi-layered ways that allow users to interact dynamically with the figures and illustrations, and provide hyperlinks to further explore topics mentioned within the pages, people are increasingly bringing them into their conversations.

FIGURE 4. This professor and his students constantly referred to their smartphones and tablets during meetings and tutoring sessions.

Social media and cloud computing spaces enhanced participants' ability to share information with colleagues, friends, and family. For example, social media enabled one participant, a pastor, to track his impact within his community of friends and followers by reading and responding to comments on his posts. Other participants invested time and effort to ensure that their businesses were visible in social media channels like Facebook and Twitter. Similarly, participants commented that cloud spaces made sharing very easy because the information was already "there" , on the cloud, and they just had to send or share the link, rather than sharing the actual video or picture which could be buried somewhere on a computer.

Ownership (Consumerization of IT)

In addition to being social resources, personal mobile devices were often shared with participants' family, friends, and sometimes colleagues. In the professional setting, the sharing of a community device presented several challenges. We observed teachers who shared their personal smartphones with

students, so they could use educational applications that they had downloaded onto their phones. We also saw teachers who shared a community iPad with one another. In both cases, teachers commented that it was difficult to manage the accounts for their device since the applications had to be downloaded through someone's personal account. Personal account purchases were difficult to get reimbursed by the school, and on the community device, with only one account able to be created, the teachers had to coordinate the acquisition of apps, and they had to be careful not to delete apps that other teachers had downloaded.

Interestingly, while we are seeing an increase in the use of personal mobile devices in the workplace, most participants commented that they still were not able to use tablets to do their "heavy" work. Participants said their tablets didn't yet "plug and play" with everything they needed to use. They said it was still difficult to print from tablets, and the integrated keyboards were difficult to type with. They commented that while some of the work related applications they use on computers are now available for tablets, the tablet versions of the apps require brand new interaction styles. Menus have been rearranged, and participants said they had to re-learn the application to use it on the tablet. Consequently, one of the biggest barriers for replacing computers is the huge investment of time required to cobble together a set of apps to serve the functions that the more integrated computer based apps already serve.

DISCUSSION: INFORMING CORPORATE RENEWAL

We work in an industry in which print media continues to displace print, so our company has no choice but to renew its business models and solutions offerings. Our team has used several techniques to connect the company to our findings, and to influence their thinking about new opportunities as the company invests in renewal (Watts-Perotti et. al., 2009). Here we reflect on the ways in which across time our engagement with our company's business groups has impacted our study methods and our ability to serve as a catalyst for innovation around the future of work.

The Advisory Board

At the beginning of the project, we recruited members of our organization to participate on a project advisory board (Watts-Perotti et. al., 2009). We created this advisory board with the goal of garnering visibility and support from relevant business groups; our collaboration ended up to be mutually beneficial. We kept membership open to everyone, expecting it would be difficult to find people who could commit the time to participate. However, we were surprised to receive many requests for membership on the board. For example, we gained members from internal groups like Human Resources and Corporate Real Estate – who were updating internal policies and practices to support employees of the future. The advisory board ultimately ended up with more than thirty members, representing fourteen groups across Xerox. This board led to new synergies that eventually led to the creation of a new cross-company team to facilitate collaboration across several of the groups whose members attended the advisory board meetings.

The advisory board proved to be an invaluable resource for keeping key players in the company involved with the project and informed about new project findings as they were released. In partnering with the business groups, we offered them the opportunity to accompany us on field visits in order to see for themselves the kinds of practices we were observing and documenting. This created

an analytic intersubjectivity between the research and business groups that was productive; in discussions about the findings, the gap between the work practice findings and their significance for solution design was minimized and our focus centered on the implications for ways to deepen the analysis and move design solutions forward.

Along the way, we received important feedback from the advisory board that helped us to incorporate their questions into our continued research inquiry. At first, one area of research focus was on the work practices surrounding printing. One key finding we had early on was that participants printed in order to address technology weaknesses (constrained screen size, usability, portability, etc.). By making the implication of this finding explicit for our business – that printing (the company's core business) could decline rapidly if or when these technological problems were solved – it caused the advisory board to look beyond printing and embrace findings about how people organize and share their information regardless of the medium. Later in the project, the company's interest in digital documentation and information flow in tandem with an increased emphasis on healthcare reform initiatives caused us to select study participants working in the healthcare industry who are using mobile and emerging technologies.

Concepts and the Design Directions Document

One way we were able to engage the company was to take our set of qualitative, descriptive findings and translate them into product and solution concepts, which are embedded within scenarios in a Design Directions Document (Watts-Perotti et. al., 2011). The goal of this document was to provide a vision for how the company might respond to study findings and implications by generating a set of high level concepts and scenarios which were mapped to study findings. The design directions document summarized study findings, provided sketches and descriptions of the concepts, and discussed how the concepts could address the difficulties observed in the study. The concepts were not specific recommendations for product ideas, but were instead high level templates that intentionally left room for readers to fill in details that resonated with their business function. The document was designed to be read by many different kinds of people within the company, including researchers working on innovation and new concept development and business groups working on product development.

Figure 5 shows an example of one of the concepts presented in the design directions document. The basic concept template was a software or service that facilitated remote collaboration. While many systems like this already exist today, we found that our participants were still not able to make them work effectively to support their tasks. We used the concept template to frame the study results about the current problems experienced with remote team collaboration, and added details to the design directions document describing how a collaborative team space might be built to better support remote collaboration (Watts-Perotti et. al., 2011). While the image representing the concept template does not include all of the contextual details that we observed in the field, each concept in the Design Directions Document was embedded within a rich description of the fieldwork findings which included images, quotes, and text.

FIGURE 5. An example of one of the concepts presented in the Design Directions Document.

Experiential Prototypes

At the end of the first year of the Future of Work study, the company invested in a complimentary project to review competitive and technological trends, and to make predictions about how the landscape of our industry might change by the year 2020. By 2011, the company had a deluge of data and reports from this 2020 project, combined with two years of data from the Future of Work project. We decided to take a step back and synthesize the data from all of these projects to determine the larger corporate implications for a forward-looking vision.

We embodied this synthesis into what we called "experiential prototypes." These prototypes were three-dimensional spaces that envisioned what work might look like in the future. For example, one prototype was a mock-up of mobile work. Observers of the prototype started by sitting in a car, and followed a story line which led them to a coffee shop, and then to the lobby of a client's building. Each area was set up to resemble a car, coffee shop, and lobby, and contained a video that described the story about who the observer was pretending to be, and included details about what it might be like to work in these spaces in the future. The videos were embedded into technology that might be used in the future. For example, the car video was embedded into a heads-up display in the windshield, the coffee shop video was played on an iPad, and the lobby video was played on an iPhone (this particular prototype was created to envision the near-term future).

In addition to the experiential prototypes of mobile work, we explored aspects of work in other prototypes that embodied Ideas about what it would be like to work at home, and with remote team members in the future. We presented these prototypes in different kinds of settings, including an open house where people could freely explore the concepts and workshops that focused on specific topics.

FIGURE 6. Experiential Prototype: This is the car, which is the first stop in the mobile work prototype. The large screen played a video showing a story which walked observers through the prototype stations, and demonstrated what it might be like to do mobile work in the future. When the video was playing, it looked like the observer was looking through the car's windshield.

Workshops

We conducted workshops with product and research teams using the Design Directions Document and the Experiential prototypes to inspire discussions about their own specific work. In the workshops, we presented the concepts embodied in the document and/or prototypes, together with the study findings that led to these concepts. We then divided the audience into small teams and asked them to work on a task that would contribute to the workshop goals. For example, in one workshop, we asked the teams to discuss the implications of the study findings and experiential prototypes for our company, and then create 1-2 more concepts for services or offerings that our company might develop. These workshops strengthened our collaboration with the business groups and helped them to understand and look beyond their current practices and business offerings.

By becoming familiar with business group's questions and assumptions, we were able to tailor our findings and concepts in ways that piqued their interest and drew them into the project. In this way, our findings had more impact as they were not only the answers to the business groups' questions, but they were positioned to give them exposure to other issues they might not have originally thought to ask about.

Video Podcast

In order to reach a broader audience across the company, we embodied study findings and implications within a video podcast. The podcast was a ten minute stand-alone video that summarized key findings and concepts, included video clips from the field, and referred viewers to the design directions document for more details about the study findings. We created this video with the hope that viewers would better remember study results after having experienced a multi-sensory

representation of our findings. The video was well received throughout the company, and has been adopted by the internal Public Relations group, who is modifying it to for external presentation.

Impacting Corporate Strategy

The project has impacted corporate strategy –both at the senior management and grass roots levels. Given the urgency of corporate renewal, our project was visible to senior management from the beginning. We were able to construct the study questions and design in a way that resonated with the issues that senior management was addressing. The findings were so relevant that they traveled up the chain of management to the top of the company. Each time we presented findings to a senior manager, management at the next level up became aware of them, and invited us to present to them. At the end of the year, we found ourselves presenting to the CEO and her senior management staff.

Several things seemed to amplify the resonance of our findings at the senior management level (Watts-Perotti et. al., 2009). The study was timely, studying how work was changing at a time when print was clearly declining, and work processes were beginning to change rapidly. The study findings painted a picture of cutting edge work practices which senior management could relate to, since many of them engaged in some or all of these practices themselves; and the picture painted by the findings were different from the work styles that our company typically supported. The format of the findings presentation also seemed to make an impact. We included rich examples to illustrate findings, supported by images and video. We also presented a set of provocative questions at the end of the presentation, which allowed us to lead a discussion about the implications of the study on the future directions for the company. Ultimately, the study emphasized the importance of some of the issues and activities that senior management was already starting to address, while at the same time provided rich details to support the forward-looking vision of the company.

While it certainly helps to have access to senior management, we typically focus much of our efforts on making an impact at the grass roots. Over the past several years, we have found several ways to make an impact at this level. One way is by partnering with technology-focused research teams. In the second year of our study, we partnered with a team that was interested in developing mobile technology. Members of this team provided input into our study questions, accompanied us to the field, and brainstormed implications for the study findings. We have found that we can make a significant impact on the partner project directions and solutions in this way because we can create study questions that are relevant to the team, make them aware of patterns that they did not expect to see in the field, and collaborate to determine implications both for their team and for the company as a whole. This partnership grounds the technology development and makes it more relevant for potential users.

We have also worked closely with product development teams to determine implications for their product features and roadmaps. For example, we conducted workshops with teams who were developing mobile print solutions, and we worked closely with a product marketing team in that business group, who was working on longer-term roadmaps and marketing campaigns.

CONCLUSION

These days, business groups and product teams are often so busy solving current problems that they often do not have the bandwidth to look beyond their current practices and business orientations.

This has always been a problem for corporate researchers – to make impactful connections with frenzied development teams who are driven by deadlines and the bottom line. Our Future of Work project was successful both in creating buy-in for the project across the company and moving beyond qualitative findings to envision explicit corporate implications from the study and facilitate innovation within the company.

Qualitative findings of ethnographic studies may not always help a company draw explicit implications. We used several techniques to envision study implications in the Future of Work project. We brainstormed explicit business-relevant implications, envisioned possible responses to study findings through a design directions document, experiential prototypes, workshops, and a video podcast. It was not enough to just present our observations from the study. In order to have impact we had to take a finding and dig deeper to find the true implication of the practice (e.g. people are only printing to make up for the shortcomings of their current technology solutions).

As the nature of work continues to change with the continual introduction of more and more new technology that makes it easier work anytime, anywhere, exploratory studies on the emerging practices will grow. Our ethnographic studies of workers on the cutting edge of these changes have informed a more grounded renewal of our company and a set of practices that continues to help us have impact within the company.

REFERENCES CITED

Adoniou, Harr, Harrington
2011 *U.S. Printing and Publishing Market Sizing 2010 – 2015*. Infotrends report, December.

Crook, Jaffe, Boggs, Drake
2011 *Worldwide mobile worker population 2011-2015 forecast*. IDC #232073, Volume 1, December.

Keitt. Brown, Schadler, Martyn
2011 *Demystifying the mobile workforce. Leverage Forrester's Mobile Worker Taxonomy To Facilitate Remote Working Styles*. Forrester report, June 7.

Llamas, Stofega
2011 *Worldwide Mobile Phone 2011-2015 Forecast Update*. IDC Report, December.

Mainelli, T.
2011 *Worldwide and U.S. Media Tablet 2011-2015 Forecast Update*. IDC report, October.

Meerwarth, Tracy L., Gluesing, Julia C., and Jordan, Brigitte.
2009 *Mobile Work, Mobile Lives: Cultural Accounts of Lived Experiences*. NAPA Bulletin 30, John Wiley & Sons.

Vartiainen, M.
2006 *"Studying Mobile Workers' Workspaces."* Researcher Workshop, Helsinki University of Technology, 1 Feb.

Watts-Perotti, J., Sprague, M. A., Swenton-Wall, P., McCorkindale, C., Purvis, L, McLaughlin, G.
2011 *Exploring Documents and the Future of Work*. in M. H. Szymanski and Jack Whalen (Eds.), Making Work visible: Ethnographically grounded case studies of work practice. Cambridge University Press.

Watts-Perotti, J., Wall, P., Mclaughlin, G.
2010 *The Future of Knowledge Work: Predictions for 2020*. On the Horizon Journal, 18(3): 213 – 221.

Watts-Perotti, J., Sprague, M. A., Swenton-Wall, P., McCorkindale, C.
2009 *Pushing New Frontiers: Examining the future of paper and electronic documents*. In the proceedings for the Ethnographic Praxis in Industry Conference, September, Chicago, IL.

Wertsch, J. V.
1985 *Vygotsky and the social formation of mind.* Cambridge, MA: Harvard University Press.

Web resources

http://www.cnbc.com/id/44612830/Companies_Embrace_Telecommuting_as_a_Retention_Tool

http://www.businesswire.com/news/home/20100131005063/en/Strategy-Analytics-Global-Smartphone-Shipments-Jump-30)

http://www3.ipass.com/about/mobile-workforce-report/archive/mwr-052411/

http://www.infotrends.com/public/Content/Press/2012/01.11.12.html