

Pushing New Frontiers: Examining the Future of Paper and Electronic Documents

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Rapid socio-technological change is underway in the world of work. The Xerox Future of Work team conducted ethnographic studies to explore the impact of these changes on the use of paper, printing, and electronic documents. Study findings revealed needs and requirements for workers of the future, and influenced the research directions Xerox is undertaking to explore how documents (both paper and electronic) play a role in the world of work. The team used several techniques to encourage innovation within the company, including the creation of an advisory board, a video podcast and a design directions document. By developing growth spaces that often require new business models and business innovation, the project is a strong example of how ethnographic studies can “take CARE of business.” The project has also “taken care of BUSINESS” by lowering risk, driving innovation, and demonstrating the value that ethnographic studies can bring to the corporate world.

INTRODUCTION

Rapid socio-technical change is underway in the world of work. Mobile technology and access to broadband internet have evolved enough that they now provide the opportunity to work anytime, from almost anywhere. Many companies are using these capabilities to send some of their employees home to work, effectively lowering real estate and commuting costs, and attracting a diverse set of workers. Workers are often members of globally distributed teams, who collaborate to create complex, interconnected webs of dynamic information. Video, audio, and databases of images are entering the world of work, along with Web 2.0 applications like wikis, podcasts, blogs, and social networking sites. The convergence of these trends is creating significant changes in the workplace.

The Xerox Future of Work team conducted studies in 2008 to explore the impact of these changes on the nature of work. Using an ethnographic approach, the team conducted interviews and observations of people who work at home or on the go. The people studied were already working at the forefront of these trends, participating in alternative work scenarios that didn't include office cubicles, and using new tools and technology to support these new kinds of work. The team studied how participants used technology to coordinate their work, how they balanced and/or integrated work and personal life, and how the nature

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of documents, printing, and paper was changing. Study findings revealed needs and requirements for workers of the future.

The Xerox Future of Work team has used the study results to support the corporation in looking beyond its traditional comfort zone of printing and document management. By developing growth spaces that often require new business models and business innovation, the project has been a strong example of how ethnographic studies can “take CARE of business.”

To improve the impact of this study, the team used several techniques to facilitate dissemination and adoption of the findings, and point business users to their innovation potential. For example, we created high level concepts and scenarios to envision study implications. We then disseminated these scenarios and concepts through internal communication mechanisms, including a design directions document, brainstorming sessions with teams across Xerox, and a video podcast. These materials were multi-modal, including images, video, and audio, in order to reach the broadest possible audience throughout the company.

The Future of Work team also created an advisory board that included key stakeholders throughout the company. We use the word “stakeholder” as defined by dictionary.com as “a person or group that has an investment, share, or interest in something, as a business or industry.” The stakeholders in our advisory board held a vested interest in the project because the findings held the potential to influence the direction of their own projects and organizations. Some stakeholders worked in Xerox business units, and others led changes in Xerox’s internal work practices. Advisory board members accompanied researchers to the field, met quarterly to share progress with each other, and participated in brainstorming sessions. Interactions with the advisory board helped shape the research questions and pushed the stakeholders to move beyond traditional Xerox thinking.

This paper focuses on the study findings that describe how the role of paper, printing, and electronic documents are changing in the world of work. Additionally, the paper describes the techniques we used to drive change and innovation within the company.

BACKGROUND

We created the Future of Work project to explore the convergence of several socio-technological trends. One trend was that the number of remote and mobile workers has been increasing (World at Work 2007). Many companies have been eliminating office space and allowing people to work at home. A 2006 report by Forrester noted that nearly all Jet Blue sales agents worked from home and that 42% of the 320,000 IBM employees worldwide did not have traditional offices. For the last twelve years Sun Microsystems employees have had the choice between working in a static office, working exclusively from home, or working in drop-in office spaces (Driver 2006).

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A second important trend was that mobile technology has evolved enough to allow people to work almost anytime, anywhere. Millions of people now work in coffee shops, restaurants, cars, airports, and parks, in addition to their homes (World at Work 2007). To complement these new work scenarios, the worldwide shipment of smart phones has been exploding (McGrath 2007). Smart phones allow users to access the internet from browsers on their phones, and have brought about an explosion in the number of applications written specifically for these phones (Anderson 2009). For example, the iPhone is linked with an App Store that contains thousands of applications, ranging from games to business management support.

Of particular interest to Xerox was the question of how the use of documents, printing, and paper is changing. These questions were part of our focus in our ethnographic study of people participating in leading edge work styles.

PARTICIPANTS

We interviewed and observed a total of twenty-six participants. Twenty-four participants worked at home, and fifteen engaged in mobile work (work done outside a static office). Some participants fit into both categories—working at home for part of their time, and conducting mobile work during other parts of their time. The studies took place in three different cities: Rochester, NY, Grenoble, France, and Washington, DC.

METHODS

We used a combination of interviews, observations, diaries, and collages to gain a broad understanding of how work was changing. We conducted the interviews in locations where participants typically worked. They lasted approximately two hours and covered a variety of topics including where people did their work, how they coordinated and accomplished their work in various settings, how they managed information (or not), how they incorporated paper and printing into their work, and how they balanced work life and personal life. We audio and videotaped interviews, and subsequently transcribed them for analysis.

Participants prepared for the interviews by completing a diary for seven days. They added pictures of their work spaces and completed specific questions about their work practices. Completion of the diaries allowed participants to talk about aspects of their work life that they might not have thought about otherwise.

During the interviews, we complemented the conversation with a collaging technique that explored participants' ideas about their ideal work environment. Participants used stickers, markers, and any other media on hand to create two kinds of pictures: their current work environment and their ideal work environment. This technique sparked conversations about what was good and bad about participants' current work environments, as well as

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what they wished they could do to improve them. See Strappers and Sanders (2004) for more discussion about this kind of method.

SUMMARY OF KEY FINDINGS

While we were interested in the general changes in work practices, we were also specifically interested in how these changes would affect printing behaviors, and the use of paper. The findings summarized in this paper focus mainly on document usage and printing behaviors. See Watts-Perotti et al (submitted for publication) for a summary of other findings from the study.



FIGURE 1 ATTEMPTS TO MINIMIZE PAPER USAGE. While some participants did still use paper as part of their workflow, other participants tried hard to minimize its use.

While some of our participants still used paper as integral parts of their workflows, other participants invested considerable effort in minimizing their use of paper. Several participants claimed that they did everything digitally, including reading reports. If these participants happened to take notes on paper, or received paper from other people, they scanned that paper to archive it digitally on their computer. One participant had a ritual of regularly scanning handwritten notes into his computer. He took pride in the fact that he had very little paper in his office, and only had to carry a small binder to meetings.

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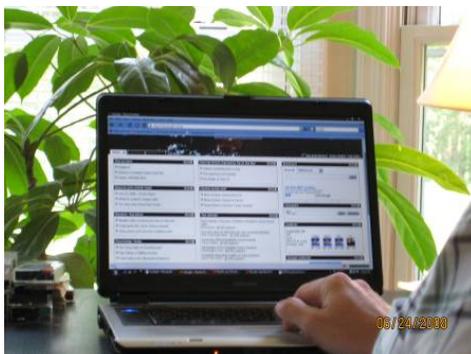
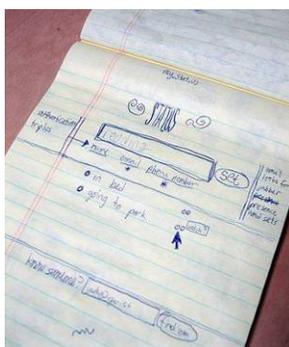


FIGURE 2 Participants used information that was not part of traditional file-based documents

Movement toward Dynamic, Nonlinear Information Structures

Participants struggled with current document formats and systems. It was hard to compare information at appropriate levels of granularity on an electronic screen. It was difficult and time consuming to transfer information across file or application borders. Cutting and pasting led to unexpected formatting changes that required large amounts of time to correct. Some participants gave up on the attempt to merge files electronically and instead resorted to printing disparate files that needed to be merged, and scanning them back into PDF in order to create a file that included all of their desired information. In general, participants found it difficult to isolate, chunk, move, and access the right information at the right time. To compensate for these difficulties, some participants were already using alternative tools like DITA (an XML-based tool that facilitates content reuse), wikis, and other information structures that make it easier to use and re-purpose smaller chunks of information more fluidly.



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FIGURE 3 Paper was used for transient purposes, like note-taking, and was usually discarded after use.

The Transience of Paper

Sellen and Harper (2003) described several ways in which paper supports temporary tasks in various stages of knowledge work. Some of these tasks include planning, reviewing and marking up documents, making notes, and sharing information during face-to-face meetings. Our study supported these findings. Participants in our study used paper mostly for the same kinds of transient purposes. Most participants did not keep much of the paper they used. In fact, several participants were scanning paper to archive it so they did not have to deal with the huge piles of “cold files” that Sellen and Harper refer to as a significant problem.

Printing as a Compensation for Technology Weakness



FIGURE 4 Participants printed documents to edit them by hand, and then manually re-typed the edits into the electronic version of the documents.

Another way to look at paper’s transient role is to see printing as a compensation for technology weakness. Participants in our study printed for the following reasons:

- To remind themselves of what they needed to work on (piles of paper on their desks helped participants remember what they needed to work on by functioning as visual to-do lists)
- To read on the go
- To make sure their documents printed the way they were supposed to print (ie: to make sure the layout and formatting were correct)

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- To easily handwrite comments and corrections in documents like PowerPoint files (handwritten notes would then be manually re-entered into the electronic version of the document)
- To transfer signatures (a document would be printed, signed in handwriting, and then either scanned back into the computer, or sent directly to a recipient)

All of these reasons for printing are reactions to technology weaknesses. For example, people printed to remind themselves of what they needed to work on because things got lost in the vast network of information hidden behind the small screen on their computer. Participants said they printed documents that needed to be processed, or worked on, because they lost track of them when they disappeared into their computer. Mobile people printed to read in an effort to overcome screen size, power management, and portability problems in current electronic technology. They printed to edit documents because it was easier to write and draw comments on a paper version of a PowerPoint slide than it was to find the menu that allowed them to insert a comment, position the comment box, and type the comment.

It is important to note that when technology developers find a way to solve the problems that are causing people to print, printing will not be necessary to address those particular problems anymore. If technologists solve these problems quickly, printing could decline faster than we might predict.

DISCUSSION: TECHNIQUES FOR DRIVING INNOVATION

We found that it can be very difficult to explore evolving technologies because businesses are committed to their current practices. We therefore devised several techniques to help influence and open up thinking about new opportunities in such growth spaces. This section of the paper describes these techniques.

The Advisory Board: Garnering Support within the Company

One of the first things the team did was create an advisory board consisting of key stakeholders throughout the company. These stakeholders had a vested interest in the project because they needed the information produced by our project for their own work, and they did not have the resources to invest in their own studies. Some stakeholders worked in business units responsible for creating Xerox products, and others led changes in Xerox's internal work practices. The purpose of creating this board was to make connections, and build resonance with groups in the company who might benefit from the project.

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Advisory board members provided input into the project research questions, tracked the project's progress through quarterly status meetings, shadowed researchers in the field, and participated in surveys and concept brainstorming sessions.

Functions of the advisory board – Since advisory board members had the opportunity to shape and contribute to the project, they felt a level of ownership and commitment to the project. A result of this commitment was that advisory board members opened doors within the company to attain more visibility for the project. They introduced the researchers to other key stakeholders in the company, and invited us to present the project to groups in the company that we would not have been aware of without having the connections from the board members.

Another function of the advisory board was to create resonance for the project within the company. In gaining exposure to questions and concerns from various stakeholders, we were able to not only answer their questions, but push them further than they might have expected, by challenging some of the assumptions that resided behind their questions. We were also able to tailor our findings and concepts in ways that piqued their interest, and drew them into the project, so they could hear not only the answers to their questions, but also gain exposure to other issues they might not have originally thought to ask about.

In addition to creating buy-in and resonance, we also gained opportunities to conduct internal research. For example, we discovered groups in Xerox who were working on solutions for future workers, and tracked their activities to learn more about their processes. We also conducted a survey of the advisory board to get their feedback on a set of concepts that were inspired by the fieldwork findings.

Another function of the advisory board was that it provided the opportunity for cross pollination and vicarious learning. The quarterly status meetings provided a chance for advisory board members to get to know each other and track other activities in the company that might be relevant to their own work. In fact, some of the liveliest discussions took place during round-robins at the end of each quarterly meeting, where advisory board members shared information about the work they were doing.

Benefits of the advisory board – The advisory board benefited both the members of the board and the project. One benefit for the project was that it facilitated new unanticipated synergies that we would not have discovered without the board. For example, during the year, one of the board members initiated a study exploring the possibility of placing a printer in a coffee shop. Given our interest in mobile printing, he invited us to collaborate with him on study planning and allowed us to conduct observations in the coffee shop during the study. This collaboration was mutually beneficial since he provided the framework for us to enhance our studies, and our observations enhanced his study results.

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A benefit for the advisory board was that the project provided research into questions that board members were already interested in for “free.” Board members needed to know the answers to the questions the project was exploring (to inform their own projects), but they did not have the resources to pursue the questions on their own. This is the main reason why so many people participated in the advisory board activities.

In addition to new synergies for our team, advisory board members also created new synergies with each other. Some of these synergies 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 also provided the opportunity for the project team to influence many levels of the corporation in parallel. Board membership was open to anyone who was interested, and included people at all levels of the company. Therefore, quarterly updates provided an efficient way of connecting with people at different levels within the company. Updates often led to invitations to present to other interested groups within the company. In fact, at the end of the year, we even presented directly to our CEO.

By staying attuned to various functions across the company through the advisory board meetings, we were ultimately able to focus the study and analysis in ways that resonated enough with the company to garner attention, while also creating evocative/provocative views of what is possible. This then allowed us the opportunity to create a bigger impact within the company.

Envisioning a Response to Study Findings

The qualitative findings of ethnographic studies may not always help a company draw explicit implications. The future of work team attempted to make implications more evident by creating deliverables intended to provide a vision for how the company might respond to the study findings. For example, we created high level concepts and scenarios to envision study implications. Concepts were not specific recommendations for product ideas, but were instead high level concept templates that intentionally left room for viewers to fill in details that resonated with their business function.

Concepts and scenarios were communicated through a design directions document, which mapped study findings to concept ideas. The document summarized study findings, provided sketches and descriptions of the concepts, and discussed how the concepts could address the difficulties that we observed in the study.

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FIGURE 5 Virtual collaborative team space: an example of a concept template developed as part of the Future of Work project deliverables

Figure 5 shows an example of one of the concepts developed as part of the Future of Work project deliverables. 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.

Making Findings Memorable

In addition to creating deliverables that attempted to clarify the implications of the study for the company, the Future of Work team also created a video podcast to summarize study results and introduce some of the concepts. The podcast was a ten minute stand-alone video that summarized key findings from the study, and included video clips from the field. The team used the video as part of the final project presentation, and provided access to it when people within the company asked for materials that summarized the study. We created this video with the hope that viewers would better remember study results after having experienced a multi-sensory representation of our findings.

Influencing Corporate Strategy

The Future of Work project was given strong support from management throughout the year. As the project developed, presentations were scheduled with increasingly higher ranked executives. As these executives were exposed to the project, they began to spread the word about the project to their colleagues, who then wanted to know more about the project. Each time we presented to an executive, the presentation was followed with

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discussions about what the future of paper and printing might look like. The project seemed to play an important role in helping these leaders break away from their focus on current business, become more aware of new trends like remote and mobile work, and begin to think about how the company might need to position itself in the face of rapid changes in the workplace.

One of the messages that seemed to challenge some basic business assumptions was the finding that the reasons participants were printing could be seen as compensation for technology weakness (as described above in our findings section). This was a different way to look at the transience of printed documents, and if true, this hypothesis means that technology developments could quickly lead to a rapid decline in the use of paper and printing—which is Xerox's core business.

The Future of Work team's presentations to these executives also stressed that in the face of such rapid change in the workplace, the company needed to explore alternative business models, and be prepared to respond if paper and printing actually do unexpectedly decline. By investing in the development of new business models, the company could drive more innovation, while at the same time lowering the risk of failure by developing alternative plans if the core business took a downturn.

As news about our project spread, we were eventually invited to present to the CEO and her Management Committee. In response to this presentation, several executives mentioned that they would use the information presented in upcoming strategy planning sessions. Ultimately, we discovered that Xerox was in the process of integrating some new components into the company's formal strategy. These components seem to have been inspired by the findings of the Future of Work project.

CONCLUSION

The Xerox Future of Work team conducted ethnographic studies to explore how work was being affected by the convergence of several socio-technological trends. Study findings have influenced the research directions Xerox has been undertaking to explore how documents (both paper and electronic) play a role in the world of work. The findings have also supported the process of evolving the corporate strategy to enable the company to be prepared to develop solutions and services that will support future work practices. For example, by pointing out that printing can be seen as a compensation for technology weakness, we encouraged the company to consider other possibilities for why paper plays a transient role in current workflows. By framing this transience as a compensation for technology weakness, the company has begun to watch for specific types of technology development that might be disruptive for paper and printing workflows. In fact, not only can we keep track of potential disruptions, we could even become the creators of these disruptions.

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By creating evocative possibilities for how Xerox might evolve our current offerings, connecting these possibilities to the right people within the company, and communicating our study in ways that resonate within the company, the team has been able to drive innovation and contribute to the possibility of lowering risk within the company. The project gave rise to new research projects examining new business opportunities that were identified. The team has also begun to impact business strategy within the company. Therefore, not only has the project “taken CARE of business,” by encouraging the re-framing of business models and objectives, the project has also “taken care of BUSINESS” by lowering risk, encouraging innovation, and demonstrating the value that ethnographic studies can bring to the corporate world. Since the studies are grounded in field-based data about the issues that people encounter in their work practices, the project is also “humanizing” business by creating opportunities for new business that will also improve the lives of workers as their work continues to evolve.

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