How do people interact with documents?

An ethnographic study

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In trying to answer the question as to how people interact with documents, we conducted an ethnographic study with 5 students and 5 mobile professionals. Below are the descriptions of our findings. Names and companies are omitted.

Participants

1. **Student A - a PhD student at Stanford**
2. **Student B - a freshman at Stanford**
3. **Student C - a PhD student at Stanford**
4. **Student D - a master student at Stanford**
5. **Student E - a senior at Stanford**
6. **Mobile Professional A - Executive**
7. **Mobile Professional B - QA Engineer**
8. **Mobile Professional C - Web designer**
9. **Mobile Professional D - Director**
10. **Mobile Professional E - Web designer**

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1. Student A - a PhD student at Stanford. Worked at office.

This Mac user says that she is the queen of backups. She says makes back ups at the end of every single day - we later found that this depends on workload that day. She organizes her files on her laptop and desktop almost in the identically. She says they are identical, but in reality, not really. She makes backups in Leland, zip drives, HD on her two computers. Folders are mainly organized by physical location, and also type of files. Names of her folders were: School, SHL, text (for miscellaneous text), random, visor (for her PDA data), home (quicken, cooking recipes --- this folder didn't seem too active), comm (commuication stuff), system, game, came with. I was surprised to see she had a folder to separate the CAME WITH the computer stuff with stuff she installed after she got the computer. More interviewing revealed that she did have some useful and frequently used "came with" stuff sitting in the menu bar. The bookmarks on the two computers are also meant to be the same... she thought they were.

She first owned a desktop only. Stanford gave her laptop as well. She brings home on laptop but dun work on it when at home; only checks email. She does a lot of typing work (her dissertation) off of the laptop. The keyboard on that is better she says. But it's hard for sliding, so she put a big envelope underneath it. She avoids going online on her laptop cuz need to set up her laptop network configuration - which is different from home. Desktop became the more leisure work. Listens to music on desktop. Uses unix terminal on desktop - mainly cuz mouse would be taken by laptop.

She uses a different browser - iCab - for ease of control of font sizes which in turn effects ease of reading. Uses normal browsers when action concerns security issues, e.g. online shopping. Stuff that she prints off the web are order receipts from shopping online; or papers that she knows she is likely to " refer to more than once". The latter is cuz she knows she has a fast enough ethernet connection, that reconnecting to the site won't be a problem.

She LOVES color coding and color codes almost everything!!! And is very particular with things that she will want to refer back to, e.g. notes and calendar. For the calendar, she would even have a rough draft of what she intend to do for the day (done on a photocopy), and then hand copy what she actually did onto the actual calendar. She does all this fuss just so that she would have an easy to refer back to kind of calendar. On what occasions would she need to refer back to the calendar? Can ask next time.

Her color-coding may not always be consistent. Nor are markings on the notes that she read. For books she doesn't scribble on, she types summary of it as she reads. Therefore makes good use of a book holder. She lives with only one mouse. And since she cannot control the laptop mouse pad good enough, she plugs and unplugs to and from laptop.

She uses compartments of her bookshelf to organize her work. When there are left over spaces, junk fills it up. The more she accesses the documents, the more accessible she places them. Observation suggests that proximity is her key to define accessibility. Folders on a spiral folder on her desk are accessed at least once that week; versus folders inside the drawers she hasn't touched in some while. She updates those folders on her desk every morning, she says... The shelf right next to where she sits when she is at work holds all her most active books and documents at that time. This seemed like a quarter long setting - when she was done with some course at the end of last quarter, she quickly removed the readings from that "active" shelf, to the more inaccessible shelf further away from her desk, and in the bottom compartment.

She has a whole collection of sticky notes on her wall and papers and phone numbers she is meant to deal with; or have dealt with but haven't yet removed from the wall. (She began tidying as we spoke). She prefers to have a phone list printed out and stuck on the wall in front of her due to ease. For phone numbers she is not patient enough to use the web. Three phone lists, literally, for friends, centers at Stanford, and Profs.

Sorts her email mainly by location, and deletes all those emails that are "not addressed to [her]". Emails work partner. Appointments are done by email or phone depending on time scale: the sooner the meeting the more she uses the phone. She got 40-50 emails a day. Saved all of her emails since 1988.

She teaches. Keeps a notebook. Also keeps a calendar. Notebooks she would cut the corner of used pages so to find the most recent page quicker. Has an on-going timeline list that she adds on whenever she discovers a new medieval person. This is electronic. Contrast this with her other habit of writing down a possible citation of something. She puts it in a physical notebook. Reason is so she can easily carry it around with her between stacks in the library. She'd be carrying a stack of books too... difficult to handle the laptop (8 lb) in that case.

Surprisingly, she likes the Paragraph symbol instead of white space when typing. She doesn't look at keyboard very much when she types summary of what read. Does look at the screen when she types in her own thought. Uses and reuses a blue sticky tag for bookmaking her book whilst flipping to the index and back to search for things. Blue tag stuck onto monitor when not in use.

She doesn't usually print papers out from the web. She only does for shopping confirmations.

Observation: she read the book then typed things on the laptop. Eyes on the book and hands were typing. Put a flag on the page, checked index, and found the things she wanted. She doesn't listen to music when she reads. She checked index very often. Put notes on her notebook.

2. Student B - freshmen at Stanford. Worked from dorm room.

He works with a lot of pictures as part of his materials science research. He takes photographs of materials before and after experiments. The pictures, in addition to being a record of experimental results, are also used for papers and presentations.

He is also a biker, and participates in races. His work in materials science is related to his interest in bicycles.

His has a 10 Gb hard disk, of which about 3-4 Gb are of music. In addition to that he also burns his pictures onto CDR. Each picture is about 1 Mb each. He says he feels more secure with the data on CDR media. He organizes his mp3 files, but he also has a temp holding folder for music that he is not sure he wants to keep yet.

The software he uses often includes Excel (for graphs in reports), Powerpoint, and Photoshop.

He ftps the pictures to and from the lab and his laptop. He burns them to CD to free up hard disk space. He also backs up the lab hard disk on CD.

He has a lot of big CD wallets, containing mostly normal audio CDs. There are also picture CDs. The place where he develops his photos gives him a free CD with the pictures each time. There are some CDs of video captures (of a play or something?) which he kept for sentimental value. The wallets are kept in drawers. He says the wallets keep stuff he don't usually listen to or use.

His room is very small, and is shared with another student. The bed is very high up, so as to leave space under the bed to store stuff. He has 3 bikes under the bed.

There is a pile of papers in the corner between the desk and the bed. He said those were from some time ago and he had no time to clean up and go through them.

His color printer is placed on a shelf very high up (not convenient to reach). It was previous placed beside his laptop but was moved up when he got a CDR burner. It shows that he regards the CDR burner as being more important. The CDR burner also takes up less space than the printer.

He prints out stuff for group meetings, presentations, and sometimes overheads. But he tends to print overheads on his lab laser printer because it is faster.

There is a small shelf (about same height as desk) beside his desk. It stores the overflow stuff he couldn't keep inside the drawers (old books, more CD wallets). The things kept there are quite miscellaneous, but he knows where everything is.

There are notes (written on various kinds of paper) hanging from a string just below the bookshelf, at eye level (when sitting), supposedly to help him remember stuff to do. But he says they don't really work, because he find himself writing the same thing twice and pinning them up.

He used to have a daytimer, but gave up using it the first quarter in college. The reason is that unlike high school, college does not have a very fixed schedule. He showed us the daytimer he used. There are small clips to hold multiple loose sheets together. There are sticky notes, business cards (shops, restaurants, etc), phone numbers. There is no system to organizing the business cards, he simply shove them into the pockets available to hold business cards. There is even a (fake) schedule he printed out and showed his parents. The schedule includes "library time" as a regular activity. He still uses the daytimer for writing down and looking up phone numbers (not often nowadays as email is more common, and those are stored in his email software).

He says he might get a cell phone soon.

He describes college as "dorm/desk centered", and high school as "book bag centered". High school has a fixed schedule, and you are in school all day, so your life revolves around the book bag. Everything you need for the day is in the book bag. In college, because of living in the dorms, and because classes are scattered throughout the day, you simply take what you need for each class/activity, go out and then return to the dorm after that.

Other differences between college and high school is that in high school, because of the regularity of his schedule, he had one folder and one notebook for each class, and he took all of them with him everyday. He had a color coding system for them. The color of each notebook and folder corresponds to each subject (math, science, etc).

He still tries to have one notebook for each class nowadays, but it is no longer as systematic. He has some notebooks that have multiple pockets (designed for different subjects, but he used a notebook for the same subject). They are useful for holding handouts.

He writes on only one side of the paper in the notebooks, because he uses fountain pens, and the ink tend to bleed through the paper. This is a very big problem for math, because of the equations and formulae.

He seldom annotate his textbooks in the margins, but rather writes in his notebooks, and then keeps referring back and forth between the two. The margins are too small to write anything worthwhile, and he doesn't seem to have a habit of using sticky notes in books. Sometimes he will tear out pages from the notebooks to put in a binder/folder.

He has a wall calendar. He circles important dates, appointments, and exams on it. Which dates get circled tend to be impromptu, usually circled as he is going through the events for that month. For example, he has his father's birthday circled, but he didn't circle it out deliberately beforehand. The colors he use depend on what pen he was using at the time, but there is a tendency to use red for circles.

There is a bulletin board on the wall behind his desk. He pins all kinds of stuff on the board (in layers just like a real bulletin board). There are business cards, stickers, flyers, a small calendar, money, phone numbers, etc. He says he got one because he never had one before. There is no apparent organization to the board.

The more important things he tend to put on the desk instead of hanging or pinning them up, judging from the things he currently has on the desk versus what's on his board.

He has a lab notebook filled with sketches and written notes. He tends to use only one color, sometimes a pencil. The pen is for notes, and the pencil is for scientific results. He records stuff in linear sequence and he writes down the dates in corner. The picture files he works with are named by date, so there is clear correlation between the notebook and the electronic data.

He uses his Leland account as temp storage, kind of like a file dump, so no organization there.

He has a drawer full of folders. They have color tabs, and his original intention was to have some kind of color coding, but they didn't work out that way. He does think they look nice though, and I get this feeling that the colors are actually useful for locating folders, even though he says he didn't come up with a system for color coding the stuff. Interestingly, these folders tend to mirror his email folders on the computer. He still puts stuff into the folders but they serve more like an archive than something that he keeps referring to. He says that he keeps all these old papers because someday he wants to make a scrapbook of his memories.

He reorganizes his email every now and then. They tend to get cluttered as time goes by.

He reads newsgroups regularly. There is even one for pen collecting. He collects fountain pens.

He does his reading sometimes on a couch in the dorm lounge, sometimes in the library and sometimes in bed (with a flashlight). He tends to do light reading before he sleeps (e.g. magazines). Sometimes he wants to write down or highlight something but he forgot to bring a pen up with him.

He studies at home, at the computer, or in the library. Sometimes when it is hot, he will sit out in the corridor on a chair. He thinks he is more efficient studying in the library, but he doesn't do that as often as he should.

(add ons by second interviewer)
Realized that highlighting doesn't help him retain much information and so uses notebook to take notes when doing readings. Use notebooks and not annotate on the sides because he feels that having a notebook will be more condense -- the note will "be all there". Writing separately in a notebook also encourages you to use your own words. Also uses tags to mark the chapters. He would also annotate in the margins if he has a pen with him (which is usually the case, except when he is in bed). When he is in lecture, he would draw A LOT in the margins. Attention span not too big at all.

When writing into his notebook, he would only write on one side. He loves fountain pens and writes with them whenever he has write essay based stuff. Notes are usually short, punctuated. Dun really look back at notes unless have to write a paper or for exams. Used to take a lot of notes when in highschool. But now, not really -- cuz he couldn't write as fast as the prof talked! Also notes organization not as clear... try to have a lecture session and a homework session for Math. But now just lecture notes and session notes simply follows on date-wise.

If there are still pages left in a notebook after a course, He recycles it by tearing out used pages and storing them into a folder. What remains is a nice new notebook.

Things he wanted to do he would save it on his computer desktop. For example, he wanted to apply for some fellowship - didn't have time to fill the form in when he came acrossed it the first time and so saved it on the desktop to act as a reminder as well as easy access. He would also make the ASSU online to homepage to remind himself to do something about that. He would bookmark - but for classes webpages, for example, he simply types in part of the homepage address until the correct "history" completes the address. Tries to keep bookmarks in folders. When browsing, he usually browses full size, cuz he would usually be 100% web surfing. Dun read online.. find it eye straining. only skim.

He deals a lot with pictures taken from the (material science) research lab. Since he would work late, he likes to ftp his work from research lab back to the dorm - he would use the leland account as a temporary storage space... once he is certain that he has the necessary back up either on his own computer and/or on the lab's machine, he would remove stuff on the leland machine.

His emails are EXTREMEMLY organized. (and is organized in (almost) the same fashion as the physical folders he keeps in his bottom desk drawer). He has a folder per class, academic advisor, doesn't really delete any mail. He keeps everything, including the bike number paper from competitions cuz he feels that one day he would look through them and will bring him a lot of memory. Stuff that he would like to buy (trades a lot from ebay) he would print out -- e.g. printed out a couple of watches he wanted to buy, from ebay. Other folders include: family, close family, close friends and relatives, high school friends, home cyclists -- there will be overlaps here where he would put home cyclists into the friends folder. This overlapping gray area is the same as his phone book - where he hasn't yet figured out a good way to name his acquaintances - sometimes he would go by first name, sometimes last name, or even D for doctor. In both his email folders and his physical folders, he would have prepared the folder + tag, anticipating that he would need that folder, but later turned out that he didn't need it.. and doesn't empty it out..... (this automatic reminder of clearing out unused folders is a potential for improving work flow!!)

Important stuff he would leave on the desk (but would usually like to leave his desk relatively clean -- simply stuff everything in the shelf to his far right.) His desk surface's stuff corresponds to "documents I haven't worked through yet".

3. Student C - a PhD student at Stanford. Worked from library.

Working environment in Green library since she needs to access many books for her papers and dissertation. The library has storage boxes for their books -- no need to carry around.

She uses web emails to transfer versions of her paper from workplace to workplace. Uses Yahoo mail cuz, unlike stanford mail, it maintains the format of the word document. Everytime she sits at the workstation, she would open a new word document, and then copy and paste relevant parts of the paper she wants to

modify at that time and then save and work on this new document. Imagine how many versions of the same paper she must by now have!

She tries to keep one folder per paper that she writes. All the relevant papers along with some paper that happen to be lying around at the time might end up in the corresponding folder. She would use the back of blue (ads) paper to do scribbling on thoughts. The blue will stand out among the white.

When she reads the abstracts that she printed out. Rather than resting the piece of paper on the desk, she rests the paper on her left hand - how weird.

Uses a book stand so she could type with both hands.

Search on the web and use e-documents. Selected articles she wanted. On the screen: a list of abstracts she printed out. Checked email. Printed out maps/directions from Yahoo. Went to the printer to get her printouts. She used email to store her papers. This way she doesn't need to carry disks with her, and can access these files anywhere that has internet connection. She used Yahoo account to store all of her paper drafts because the form would be maintained. This morning the internet connection was not too good, so she had to email to her Stanford account and use webmail to check. She usually used telnet connection to check email because she can see her previous emails. She only used webmail when she wanted to see new email. She copied her email tot the word file.

She referred to her paper documents and book a lot. She used different symbols to mean different things in her notes: "v": specific "l": general. Both of them were for her to go back at some point. She kept one folder for a paper. In the front of her bag: bills, maps and schedules. She used book stand because her hands needed to type when she read the book.

Used color paper to write down things so that she can notice it easily.

She printed out abstract to read--> convenient. Had 12 pages--> not easy to read while needed to type her document.

4. Student D - a master student at Stanford. Worked from dorm room.

This participant is yet another very organized person.

He likes working from home and has two shelves and a desk. On the shelf closer to him he puts all his books - both academic and non. On the top layer sits story books, dictionaries (chinese and english ones), and (to him) less EE related textbooks - in particular, networking and computer architecture stuff. Also sitting on this top layer of the shelf are notes cumulated over the year. These notes are simply one big pile of A4 sized paper. He puts yellow sticky tags to the first page of every course - thus acting as a course divider for his "old courses pile". However, he doesn't write anything to these tags. On the lower layer of this shelf sits the hard core EE textbooks, as well as the binders both large and small. Although in his case, it is more difficult to get to the materials in the lower layer of the shelf, only the lower compartment is large enough for the binders to stand up straight.

None of the binders are labeled - "remember by location."

Within a binder, he uses file divider to separate different courses, and yellow sticky tags to mark the chapters within a course. He rarely needs to take notes in lectures. Most of his courses have lecture hand outs which are usually stapled. He will annotate on those very lightly with a pencil if necessary. Those stapled handouts which are too thick will be unstapled when filed into the binder for ease of turning over. Thin staples remain intact. He has a binder which he carries around in his bag everyday - courses separated by a divider. When he is done with one chapter for a course, he exchanges the old material from the mobile binder with new material in the corresponding big binder.

In browsing though one of his binders, I found several cheat sheet style piece of paper. Turned out to be a summary sheet so he can refer back to his notes more easily.

He used to use soft binders in high school - cuz they are easy to carry around with. Still have those to keep the most recent but old notes with. Changed to using hard binders at Stanford for no reason.

Books borrowed from the library are considered temporary and so doesn't get a place on the shelf. They are simply placed neatly as a pile on the top left corner of the desk, next to the monitor. Close to the bottom of that pile sit books he already looked at and the top most book is the book he will use for his research work shortly. (There is a poster of Tiger woods behind the monitor.)

On the second shelf, which is closer to his bed than to his desk, sits the music CDs, an alarm clock, a huge camera in a fancy case and recently developed photos.

He was working on his problem set. He wrote with a mechanical pencil and on a line-less piece of paper. He had a binder of notes opened to his left. He drew some lines for a diagram without a ruler. After about 20 minutes of working on the problem he says the homework is too tedious. And thinks that there is a Matlab program he wrote previously that should be useful. He tries to dig that file out from his leland account. He (dangerously) telnets to a leland machine and opens an xwindow, and then closes the telnet window once the xwindow is opened -- only wants windows that are relevant opened. In order to remember where the program file is in leland, he looks through the opened binder in front of him. He later realizes that this is the wrong binder and goes to another binder to look for it.

Notes that does not yet belong to any course (qual exam stuff and research stuff), wanted to keep and dun yet have time to sort through are sitting in front of the shelf. Small collection of catalogs, newspapers, and scientific magazines sit beside the shelf.

Drawers in his desk are organized too. The center drawer contains all the "will attend to when free" materials, mainly letters. Top drawer: stationary. 2nd: files and folder for offer letters (in original FedEx envelope), and school related letters. 3rd: mixture from recipe to piano score (he dun really play), to more school reports (he forgot that was there) and manual for casio calculator. 4th: new paper envelope checkbook, plus a huge folder of important documents in a folder organizer labeled by manufacturer with alphabets. He uses B for Bank, C for Credit card, etcetc. Of course, not all letters are used exactly and some sections are less organized.

His email:

Inbox	all non sorted mail	
Jobs	Agents	jobs that came to him but he's uninterested
	Engaged	already began the discussion
	Reserve	those with potential offers
Life	thought would use but only have one mail	
Personal		
Record		
School	Courses	
	General	
Temporary	- can be deleted soon e.g. car, friend	

Dun visit newsgroups at all.

This morning he woke up 10am, as usual read news.com and checked indices at my yahoo.

When browsing, he likes Netscape, because he uses Netscape to check email and stuff. But when he knows the page will have a lot of Java, he will use IE, since he knows from experience that Netscape will crash - which would be highly undesirable especially if he is in the middle of some email. However, all his bookmarks are in Netscape. Thus, the default page for his IE is the bookmark.htm of Netscape. This means that he cannot add bookmarks when using IE. A second habit that I found surprising is that he likes

using the right mouse button pop-up menu to go "Back". This is habitual because in Netscape, he minimizes the toolbar buttons on the top to maximize screen space (kinda greedy I think cuz he is already using a 17" monitor.) So he would not click on the Back button even when using IE where the back button cannot be minimized.

Do not keep rough notes. One sided print out papers reuse as rough paper.

5. Student E - a senior at Stanford. Worked from dorm room.

Did not really do any organizing. With emails, he says, it is sufficient to use the search, or the time thingy. He deletes all emails that are not addressed directly to him. He would tear out parts of his notebook (for class) if he was on the phone and needed something quick to write on. He ultilizes the fact that his notebook has compartments and folder parts to put loose pieces of paper that are relevant to that particular section. He is now a senior, found a job and does care less about his classes anymore. He would work therefore work from home. But he used to go to the library for any serious work. He would also write notes into this notebook as he read. But now, since he doesn't care anymore, he simply make quick notes on the margins of the book, if anything.

He does his problem sets from his multipurposes notebook. He writes only on one side of the paper, and when he does his problem sets, he tears out the page as soon as he finishes one page, so he can refer back to it easily, without having to flip back and forth.

6. Mobile Professional A - Executive. Worked from Office.

His company does consulting work and UI design for clients' web sites. They have offices in several states. Things he does for the work: interact with clients, have people (user experience group, UI designers) report to him and communicate with people. They do client strategies, help with clients' market research and usability research. He just moved here a month ago. Before that, he did a lot of traveling.

He uses Outlook Express to check emails. He usually checks email between 6 to 6:30am because he might need to contact offices in the east coast. He works at home on Thursdays. His day is very reactive. He checked email pretty often, and got phone calls (both personal and work related) several times during the interview. He needs to do a lot of communication and interaction with people. He felt that web interface email is not very convenient because you can't see the whole emails at once. You need to go to folders.

Reading environment: a big desk with drinks, snack, lunch, a phone, a laptop, a monitor and several stacks of documents on the top. Pictures and a calendar are on the wall. On the desk: articles that were printed out from the web and a notebook-substitute for Palm Pilot. He uses notebook to summarize what he did. When meeting with clients, he takes notes. His Palm was stolen. He used to use Palm to read NY Times and Wall Street. If he find anything interesting, he puts on the Palm too. He likes working in different media. Put magazine at the edge of the desk, so if people come they can read them. If they like, they can take magazines with them. The calendar is used for setting up people's vacation/travelling plans.

Recycle box: fax stuff, emails, sticky notes, old magazines. Information changes so fast, and he throws away old stuff if it's over a week. He has a small box to put all business cards. There is an index for the cards...easy to browse. Fax stuff: usually throw it away after being used once, or goes to business operation or HR.

He felt laptop is very powerful. Easy to take to client's site.

Work long hours. Uses excel spreadsheet to generate data. Use PDF files and like work on the PDF files a lot. Everyone can view it. Types of documents that people send back and forth are Word, PDF and PowerPoint. Everyone can comment on the same document. He has templates form difference pieces of documents. A person would be in charge of editing all these documents.

Prefer doing comments on hardcopy. Put sticky notes on the documents (great manipulation). He thought that it would be good to have a program/document that has a summary of what has been changed in the document, or a master copy automatically that can be changed by people. Used flags for annotation.

When discusses ideas with people in the office, uses whiteboard to put documents on the wall, so everyone can see it.

Hands in hard copies to people because he wants to make sure everyone has it and read it. If he needs to copy and past documents from the web, he would need to summarize it so he would rather not to do it. If he just prints them out, he doesn't need to think, although it's still work. Face to face meeting / delivering papers builds relationship. Get direct feedback. Email is good for: "Do this." and bad for ongoing communication. Use hardcopies to initialize the process, then you can build the relationship--> can use email to transfer e-documents.

He likes explaining his thinking by thinking, not by email. Problem with email: a guy didn't get a copy of the document because he was not on the group list. Easy to forget whom you sent to as supposed to face to face interaction.

When he is at home, he does not really think about work, but he does some communication and collaboration work.

His thoughts on email vs call: over relies on either channel would get you in trouble because people respond differently.

7. Mobile Professional B - QA Engineer. Worked from office.

- She has a CS background. Previously she was working in the banking sector, dealing with financial apps. She also does usability testing and occasionally have people come to test their software.
- The "paperless" office appears to be central to their work culture.
- Email is central to communication. She receives a lot of emails every day. She prefers Outlook over Eudora because Outlook has better support for mass emailing and drag-and-drop capabilities, making it easier for her to contact the people she need to contact more easily. Outlook also offers better integration with other programs, such as inline viewing of attachments or automatically opening up the attachment in the appropriate program (Eudora is not good for viewing html files).
- She runs Mac OS on both her desktop and laptop. She has another PC mainly for QA testing purposes. The Mac is also used for QA testing.
- During the interview, her Mac ran out of memory several times. She was able to recognize that and take the appropriate actions (i.e. close some apps). Looks like a daily occurrence for her.
- Although email is the major mode of communication, she says the phone is also used if you need quick response or if the issue can't be resolve easily through written words. During our interview, she received a phone call from a colleague on how to find something specific on the company intranet. She was giving detailed instructions in real-time.
- She checks her email and her "bookings" first thing in the morning. The company uses a third-party groupware application to schedule meetings. People can be booked for meetings, and then they get to choose whether they want to reject or accept. The system emails you when you get booked. She thinks there is an option to book certain time slots as being "unavailable", but she doesn't seem very sure. She also says she doesn't like the system, but mentions that some people seem to like it.
- Although you can book other people's time just like that and they have the right to reject you, she says that most people (or some people?) still send an email first, asking "Can I make an appointment?" Clearly, politeness is an important aspect of social interactions.

- Most people spend half their time working from home, but she had to buy her own laptop to support this, as the company doesn't provide them with the machines. Her laptop is equipped with a wireless modem. Not everybody has laptops.
- Those who have laptops bring them to meetings, and take notes on meetings. She says she also take notes on her laptop.
- Paper documents are still used though, for the benefit of those who don't have laptops at meetings. Things that get printed include plans and specs. She mentions program scripts (QA engineers write a lot of these) where they usually do debugging over the printed version.
- She also prints out technical documents for reference. She was referring to one (with instructions on how to locate certain software over the company intranet) when she was helping her colleague over the phone.
- Paper communication does appear to be quite rare. Her desk has mostly things she writes herself for her own use. When she showed us around the floor later, she particularly points out the desk of one colleague where there's virtually no paper on his desk.
- She does have an In/Out box for paper mail for things such as checks, etc. Some department such as accounting and legal do still require paper documents. For example, she needs to provide accounting with photocopies of receipts/statements for claims.
- She has several empty folders on her shelves. Her cabinet is pretty empty too. She stores some random stuff inside. I saw a handbag in the cabinet drawer.
- She has an old HTML reference (version 3.2) on her cabinet (not her desk) with some colored tabs, and some Mac references on her shelves, but she says she doesn't refer to them often, perhaps like only once a month.
- She sometimes prints out emails to read.
- Her email is organized by deadline, e.g. "Do by Monday". I find this interesting.
- PDFs are everywhere. It is company culture/policy to use PDF documents. She writes whatever documents (reports, summary, etc) on Word or Excel and converts them to PDF before emailing them to her colleagues. Has certain advantage. She knows some people who do not use Word. PDF ensures everyone can view the document.
- Interesting note: to generate a PDF, you have to "print" it. Granted that it is due to technical limitations, but this is counter-intuitive.
- She can annotate the PDFs with electronic sticky notes, highlighting, etc. She gave us a quick demonstration of the annotation features. Her familiarity with the program showed that she does indeed use the features often.
- Acrobat 5 supports digital signatures in PDFs. Now they send forms to her to sign digitally and she send them back to the originator. She says it is useful when working from home. But she doesn't know who's on the other side handling the form. Another problem is that there are multiple copies of the same document, with and without the signature.
- The same problems with versioning occurs with normal PDFs. Whoever owns the master document has to collate the comments in the various PDFs emailed back.
- There are numerous documents posted on the company intranet, mostly as PDFs. The company handbook is online in PDF. She said that they transferred Word, Excel or PowerPoint files to PDF files. Sometimes they do give new hires hard copies, but the information inside tends to change often, so it is not a common practice.
- Within her QA group, they have a really nice looking group website. They post test matrix reports (results of testing) regularly, but it's not in an obvious location (she couldn't find it to show us). Old reports are archive, mainly for records.
- Bugfix reports are also posted regularly, for the benefit of the developers and the (developers') managers. These are in HTML format.
- Instructions for QA tasks are also online, but these tend to get printed out, just in case the server crashes.
- She also prints out the test matrix forms so she can check off the individual test status and annotate. After she finished the tests, she goes back into the spreadsheet to enter the information electronically. When asked why she doesn't fill in the spreadsheet electronically, she mentions switching between apps is not convenient.

- These forms are also printed out for hard copy records. She says it is mainly for audit trails, and they serve as records of what the team did in the past.
- The QA team uses a third-party software for testing, which automates the process. The QA process is very standard. The software generates emails that are sent to the programmer. It is up to the programmer to decide when to fix the bug and update the status on the system. Once QA is satisfied that the bug is fixed, they will close the bug.
- She has a couple of handwritten notes on her desk (in the form of notepads). She jots down temporary testing results and problems on the notepad. She says it for convenience and speed (no need to switch apps and type). These are also rough notes, and she adds that there is the advantage of being able to carry them to a co-worker to show and discuss.
- The notes are fairly linear, but things start getting more spatial when items are being followed-up with new findings.
- She also mentions the fact that once things get online, then they become more or less permanent. This is an interesting point-of-view. Should see if other participants share the same view.
- She had "to do" list, telephone numbers on her Palm. She also checks stock market through Palm.
- They have "IN" and "OUT" boxes for paper documents. e.g. people take train and need to show documents for compensation. Because of sending check, so sending with paper documents. bills--> on the paper, make sure you pay the exact amount of money.
- Put their documents on the web to show people what they did. Web report is the summary of progress.

8. Mobile Professional C - Web designer. Worked from office.

She is a self-employed Web designer, designing online apps for clients. Her company is still very new. She works from home, and has a partner, who works from home nearby.

She estimates that about 75% of her work is from home, and 25% at the client's site.

She sometimes does graphic design as well, and showed us a past project where she did the graphic design. The bigger clients do their own graphic design, and she will modify their design when necessary. She uses Adobe Photoshop.

Her laptop doubles as a desktop with a docking station. She has two power supplies for convenience, so that she doesn't have to keep unplugging and plugging in the power. She carries her laptop in a silver stylish-looking bag. When she's on the move, she brings along her Visor, notebook, some floppies, business cards and any printed documents she needs.

She has a Handspring Visor, kept in a soft sleeve (requires pulling out to use). She runs a time-tracking software on it, keeps track of expenses (for billing clients), and for scheduling (both work and personal), address book. She also sync her email (all of them) with her laptop. It's easier to use the Visor for quick access for an email. It is also useful for reading driving directions sent by email on the Visor. She syncs the time-tracking data with a website that does all the invoicing for her. She is considering moving on to Quickbooks soon.

OS: Windows ME. She likes the thumbnail view for graphics files because she doesn't have to open them up. She saves her current working files frequently because the OS keeps running out of memory. This happened once during the interview and she had to shut down a few apps to proceed.

She doesn't have a lot of desk space. The monitor is huge (I think it's a 19 inch) which occupies most of the space. Her mouse pad is on a swinging platform, and that is positioned over her keyboard keypad (probably doesn't use that part of the keyboard often). The printer is located on a shelf high up above the monitor.

There are two plastic crates of folders under the computer table, two baskets for trash.

There is a tray beside the monitor. In it are articles from the web, billing statements, charity stuff (flyers, etc), more documents. When asked why she didn't just bookmark those web articles, she says she could do that, but then she'll need to organize them.

She has a lot of ornaments in the apartment/office. There are ornaments on the table, on the CD rack, in front of books on the shelves.

Most of her communication is by email. Her email client is Outlook. She has special folders for the bigger and regular clients. She filters her email only for the big clients, otherwise she doesn't do organization regularly (about once a month). Find specific emails using the "sort by from/received date", which doesn't seem to work well. She tried showing us a certain very long email from somebody but couldn't locate it. She also rarely deletes stuff. Her hard disk is 20 gigabytes. If there is a need to archive, she uses Zip disks.

She also uses instant messaging software for communication. It just so happens that her friends are on Yahoo messenger, and her clients are using MSN, with a few overlaps. This enabled her to keep the two distinct without much effort on her part. She says that instant messaging is very useful for communicating with clients. She also has some clients from overseas (England). Sometimes she does quick user-testing by sending her designs to her friends via instant messaging.

What's running on her computer when we came: Dreamweaver, email, instant messaging, browser

Outside of work, she is also involved in fund-raising activities for some charities (e.g. leukemia society).

She gets requirements documents by email from client, and prints them out. Her reason being so that she can then take notes on the printed document. She also says that the screen is not big enough to view the many pages, and there is also the problem of having to switch between apps. Her work already involves switching between multiple apps. There is also the problem of having to find the right page to read when it is on the screen. Finally, she doesn't like reading on the screen.

With printed documents, she can call up the authors, ask questions, and mark up the document in red ink.

She also has a thin ring-bound notebook for taking notes and for checking off the tasks she has to do. It's mostly in red ink. During the interview/observation, she used a yellow notepad instead. When asked about that, she says she's using a different one because she forgot to take her usual notebook the last time she was out meeting the client.

Her Web designs are put up on her personal server (password protected) for clients to view online. They include screen designs, flowcharts, specifications, explanations, etc. When asked if she does paper designs and sketches, she says she did that when she was employed in a company, but now she doesn't do that anymore because paper designs are "unprofessional".

The clients like hardcopies. She showed us a 70+ page document that she once printed out for a client meeting and presentation. She had to make copies for everyone at the meeting (she charges for it, but there is actually a tax on the printed documents, because they are "tangible goods" delivered to the clients). Interestingly, the clients didn't do much with the print-outs other than look at them. She writes down their comments in her notebook, but there is no collaborative work using the print-outs. The paper documents serve as reading materials only.

She also mentions that paper documents give the clients a good feeling that work was done (since they are paying her for the work). The feeling of holding something tangible in your hands is apparently very important.

She showed us a project folder (kept inside the cabinet below the book shelves) that she compiled when she was working for a start-up (before she became a consultant). It is a very big folder, with a lot of tabbed sections. Sometimes she looked at the tabs when describing the contents, and sometimes she didn't.

There are sections in the folder where she keeps different versions of a design, but there are few mark ups. She remembers the contexts for each version, and she can recall them when she looks at the print-out. The reason she keeps different versions in printed form is that people kept asking to see them. Now that she is a consultant/designer, her clients don't ask to see previous versions, so she doesn't do that now.

One interesting thing about the company she worked at previously is the use of Powerpoint for everything. The fonts are big, there is no proper table of contents, and it is hard to find anything since they are structured like presentations instead of proper specification documents with well-defined sections and sub-sections. Despite the number of pages she printed all of them out, one slide per page.

She also printed out websites that she found interesting or where their designs were relevant to what they were doing. She also printed out stuff that friends and co-workers emailed her, things that are related to her work but not always what she was working on, things that she thought "might be useful".

One observation about the folder she showed us is the way that organization gets more cluttered with time. She didn't come up with all the tabbed sections at once. They evolve over time, and soon things start getting unmanageable. Some things she showed us are not in the correct sections. Not surprisingly, she has a "Miscellaneous" section.

She has a folder for bills and another one for receipts. The bills are organized by month, and the receipts are organized by Quickbook categories.

She has a calendar behind the desk. She used it once during the interview to look at the days of the months. When asked about why it's behind the desk, she says she just shifted her desk, and she doesn't use the calendar. She knows it is there though, that's why she didn't seem to have trouble finding it.

During the observation phase, she called a contact at the client company to discuss something about the design. However, using the phone was not her first reaction. She first looked at MSN messenger, saw that the other party was "out", and was thinking of leaving a voice message on the phone, but it turned out that she was actually in (MSN messenger later shows that she was now "in"). She says that normally she wouldn't use the phone for discussion, but this particular person is an exception because she was on good terms with her. For others, she would just make the decisions on her own.

She has a cell phone but she claims she doesn't really use it much. Email was her primary mode of communication. In fact, she intentionally makes the phone numbers on her business cards to be less prominent than the email address.

25% of her time was with client/site, sometimes work in her partner's place, and sometimes at home. Used Instant Messaging with clients--> don't need to call.
Used Yahoo messaging to contact friends, get quick feedback.
Had folders for each client.
Emails were organized by each client.
Printed out the email documents/attachments from her clients.
For very specific email, she printed it out and check things.
Printed info that she might need in the future.
Organized her bills, receipts by month.
Paper prototypes: taxable: you can touch it, it's not final. But felt drawing prototypes didn't look professional, only did once.
Use a notebook to take notes in the meeting.
Printed out her design: something tangible, show I did something. Easier to see redesign stuff. Hard to keep track when they are all in the computer. Easy to browse.
Didn't like powerpoint documents: font was too big.
Didn't like reading on the screen--> printed it out if it's too long.
She also looked at other people's sites and talked about it with other people. There was a whole binder of sites that she printed out.

Palm Pilot: track hours she spent with clients, expenses. Had work and personal address book. Email address. It's handy..all of her emails were there. She could just check directions in the email when going to a meeting.

9. Mobile Professional D - Director. Worked from office.

Had been at the same company for 8 years. Work related to 100 people. Usually interacts with 20-30 people everyday. Meetings everyday! Running for meetings. Receives about 100 emails a day.

Locks some paper documents because there are some reviews in it and he doesn't want people to see.

Has two laptops, one PC and one Mac. Prefers to use Mac because he is used to use that but his company did a lot things on PC, and he might switch to PC totally.

His emails focus on company issues. Usually kept emails for 6 months. He has a lot of documents on his desktop. He said that he needs to clean them and some stuff didn't need to be there.

All of his phone numbers are in his Palm. He thinks that Palm is not “live” enough. His meetings and schedule changes all the time, so he doesn't use it for meetings anymore.

He uses emails to take notes because he types faster than he wrote. He doesn't send email to himself, he just stores it in the folder. This way he can search these emails. If he really wants to do work and get something done, he works at home. But not very often lately because he has meetings and have been very busy. If meeting gets boring, he just read his emails. About half people use laptop in the meeting.
Meeting types: bugs review, focus group, brainstorming, status, help with problems.

If meeting with outside customers, he didn't carry laptop--> private things

He doesn't usually get voice message-usually from HR people. Sometimes he uses phone to schedule meetings. He prints some documents out because it's easier to talk in the meeting. So that they could point/check. He has a printout of weekly report, which is handy in the meeting. And also it had better layout: if it's on the computer, you could only see a part of it once and then will need to scroll down.

His paper documents are temporary stuff. Put notebook beside the phone in case he needs to talk and write things on the notes.

Digital signature: good for inside the company.

Created a document for the things on the whiteboard--> but not often. Don't have overall architecture. Engineering brainstorming: workflow--> easier to do on the whiteboard. Can't do on the e-documents. Struggle: verbal/whiteboard/paper.

10. Mobile Professional E - Web designer. Worked from home.

Designs for various clients. Collaborate closely with two other group mates, therefore does a lot of things to ensure that even when either of the three is out of town, one of the other two in the group can easily take over their work. E.g. have periodic backups in server to which all 3 can access.

Organizes her work around clients - one client per folder. Used to store per-client info in binders. Yet since she bikes to and from work, it became too bulky as she had more clients to work with. So she used folders in the end. She also stuck sticky notes on the surface of her "misc" folder. Sticky notes = things to do. Notes stuck towards the left hand side = top priority.

Used to be a Mac user, now uses Win 2000. Therefore has the taskbar on the top of the screen. When observing her at work, we noticed that she switched from one app to another frequently. Working on a webpage means looking at email from clients to see the more detailed instructions. Longer instructions

would be printed out; shorter ones are simply copied and pasted from the web email into an electronic notepad for ease of reading. Then she needs to connect to the server for files she is working on. This somehow required much work and only after a while of fiddling with the setting up of her work station did she actually start working. E.g. she opened the apps and moved the app windows in such a way that useful desktop shortcut icons (placed on the bottom right corner) can still be accessed without having to first minimize the windows. She also ensured that the notepad (with the instuctions) can be seen even with the Dreamweaver window opened.

Reference books set at the top of the shelf next to her desk. She needs to stand up and move photoframes and other ornaments out of the way before accessing those. Closer to her on the shelf sits various CDs that she burns for the client and for herself. Rite now, she only has 3 CDs. All CDs are kept in the case that they came with. Perhaps will need a CD case as she has more CD case - but she says that sending these CDs to clients are easier when CDs are in their protective cases.

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