

Getting things done

Towards a conceptual framework to support the management of multiple activities

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The nature of information work

- ◆ Information work in general is typically characterized as requiring involvement on multiple projects, initiatives and teams.
 - Middle level managers spend most time coordinating multiple activities and little time in solitary work [Horne, 65].
 - CEO's activities are brief, varied and fragmented [Mintzberg, 73].
 - Project managers' attention is unscheduled, oral and as much other-directed as self-directed [Sproull, 84].
 - Research project managers with constat unscheduled activities [Hudson, et al 2002]
- ◆ Application/document support vs. Activity support
 - Technology is not organized in terms of themes that are associated with distinct projects and duties.
 - Support for activity management lacks integration time-management, contact management, mail messaging, etc.

Constant switching at the workplace

“Today?, today there were so many different issues going on.... I mean today, I was sitting, and I had a Test script in one hand, I had a document that I was reading for a meeting in the other hand; and then at the same time I have issues on my Bloomberg monitor that I was leading with; so I’m running test trades; I’m reading on some subject; I am helping someone over the phone with something else. And then I am also trying to do this training coordination thing! So it is like constant, constant, just, multitasking, craziness, I mean it is, it is amazing! [laughs]...”

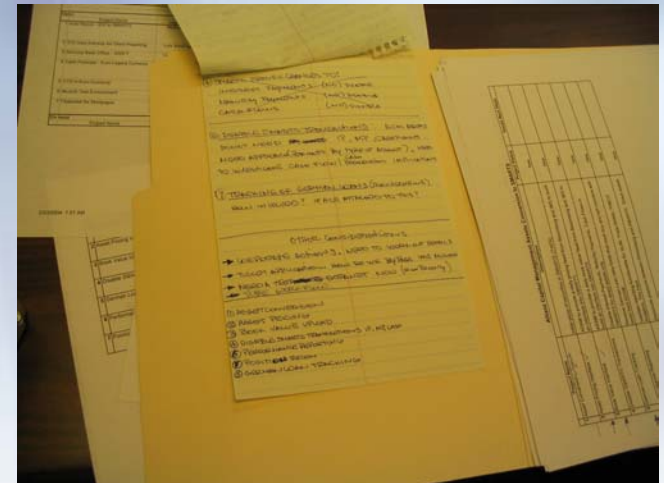


– Business-Technical Analyst

Constant switching at the workplace

“ Sometimes they [call] you and you have to drop everything and go and do something else for a while...it is like, it's almost like you are weaving through, it is like, you know, a river, and you are just kind of like: “Oh these things just keep getting in your way”, and you are just like: “get out of my way” and then you finally get through some of the other tasks and then you kind of get back, get back along the stream, your tasks, that's a weird analogy [laughs]... ”

– Business Analyst



Our research

There is a lack of comprehensive understanding about how information workers *in practice* delimit, structure, organize and conduct the variety of activities that are required for their job.

1. How does **work get fragmented** as a result of people having to manage multiple projects, initiatives or teams in a technology-rich environment?
2. What are the **strategies** that people use to maintain **continuity across multiple activities** when they face constant switching?
3. How do these **findings translate** into requirements for technology design that can help to support people practices?

Goal: To produce a robust integrative conceptual framework to support the design of information technology based on empirical understanding of activity management.

Our methods

Workplace studies

- Shadowing: Observation of practices of information workers
- Interviews
- Questionnaires

Qualitative and Quantitative analysis

- Descriptive statistics
- Grounded theory – constant comparative analysis [Glaser and Strauss; Strauss and Corbin]
 - Concepts > Categories > Propositions
 - Elements

Our assumptions

- ⌚ Activity as the central unit of analysis (Activity Theory)
 - ⌚ AT is used as a backbone to understand the *activity* of managing multiple activities
 - ⌚ Grounded theory + AT
- ⌚ Interplay between intentions and situations
 - ⌚ Activity management preferences (styles) are enacted under changing circumstances
 - ⌚ Individuals have intentions that motivate the things they do at work beyond specific circumstances.
- ⌚ Previous research has analyzed partially the phenomena of activity management
 - ⌚ The definition of a conceptual framework requires to take a very wide perspective to understand the implications of different components of the phenomena (time [Blanford; Palen], contacts [Whittaker], messages [Belloti], archives, etc).

Some results from the field

After more than 600 hours of observations, 62 hours of interviews and hundreds of documents and pictures.

Actions are fragmented

- People spend an average of 3 minutes working on a specific tool before moving to other (computer application, telephone, piece of paper, etc).
- People spend an average of 4 minutes interacting informally with co-workers

Resources are varied

- Ensembles of artifacts are involved in the management of multiple activities: email, post-it notes, agendas, PDAs, notepads, printouts, tables, etc.

Interruptions

- People interrupt themselves as much as they get interrupted

Not just managers

- Fragmentation of work is consistent across different roles (analysts, developers)

Building the framework

- ✓ Move beyond tasks (actions)
- ✓ Move beyond situations
- ✓ Move beyond the individual

Our analysis has resulted on the identification of a set of elements that become central to understand activity management.

1. Definition and delineation of activities
2. Evolution of activities
3. Individual and collective perspectives
4. Urgent vs. normal handling
5. Activities as trajectories

Element: definition of activities

- ⌚ When our informants talk about their work, they describe it in terms of the activities rather than the actions they are involved with.
- ⌚ Our informants, during observations and interviews, often referred to specific units of work such as: “the OATIS initiative” or the “the TGX specification”, or the “Clear quest application”.
- ⌚ We derived from our data the grounded concept of **working sphere**, which serves to describe an activity from the informant’s perspective.
- ⌚ A working sphere is defined as a **set of interrelated tasks**, which share a common **motive**, involves the communication or interaction with a particular **constellation of people**, uses ensembles of **resources** and has its own individual **time framework**.
- ⌚ It is the whole web of motives, people, resources, and time frameworks that distinguishes a working sphere from others.

Element: evolution of activities

- ⌚ A fundamental factor to be considered is how an activity (a working sphere), gets created, how it evolves and how their resources are defined, and how it changes from representing a current central concern to an irrelevant one.
- ⌚ Activities rarely get specified up front and people become aware of the implications of an activity as they gather more information about it.
- ⌚ Individuals often handle working spheres with different levels of maturity with respect to their definition of the constellations of people, the resources and time frameworks.
- ⌚ The lack of definition of a working sphere often results in problems whenever an information system demands many details in order to support activity management, such as specific deadlines, or specific people involved on it.

Element: individual and collective perspectives

- Differences between what the individuals vs. what the managers think about the working spheres (resources, people, time framework).
 - We have observed that what might be a single issue from a manager's perspective, becomes a set of working spheres once it is assigned to an individual.
- Activity management has to be approached both from a high level managerial perspective and from the individual perspective, and information technology should provide enough flexibility to allow that both perspectives to coexist.

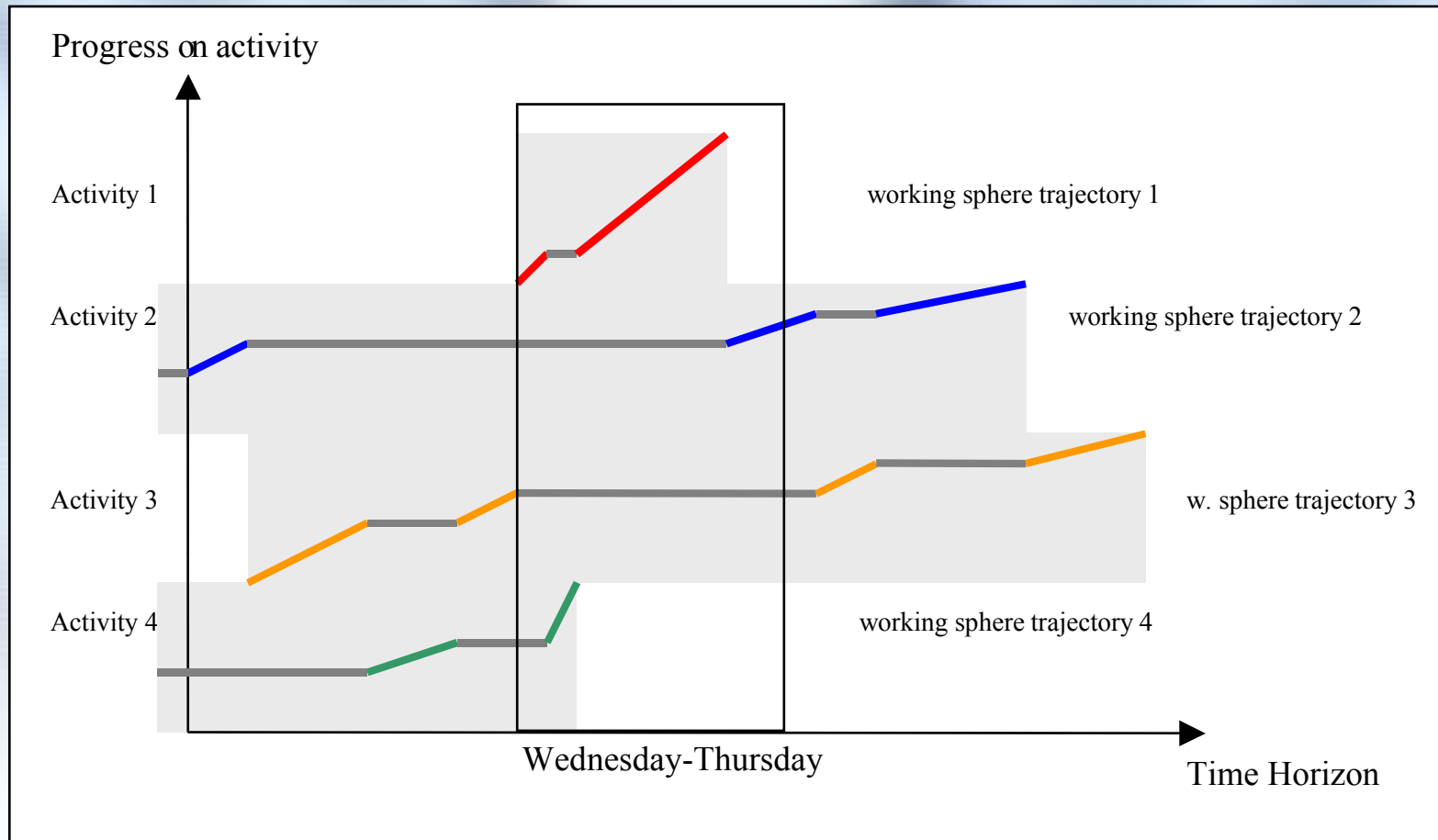
Element: urgent vs. normal handling

- ⌚ There is a difference between the strategies used by people to handle working spheres when there is a need to attend to it immediately than when it can be attended without urgency.
- ⌚ This element points out to the technological support in two main ways:
 - ⌚ We have seen that while handling urgent activities people often interact with individuals who are not part of the group of co-workers with who they normally cooperate. Systems that let people to locate expertise in a prompt way would be useful.
 - ⌚ Given that people often have to provide accounts of what was done to solve urgent problems and they do not have time to do it while solving them, a system that records the activities performed will facilitate the reconstruction of the actions taken.

Element: activities as trajectories

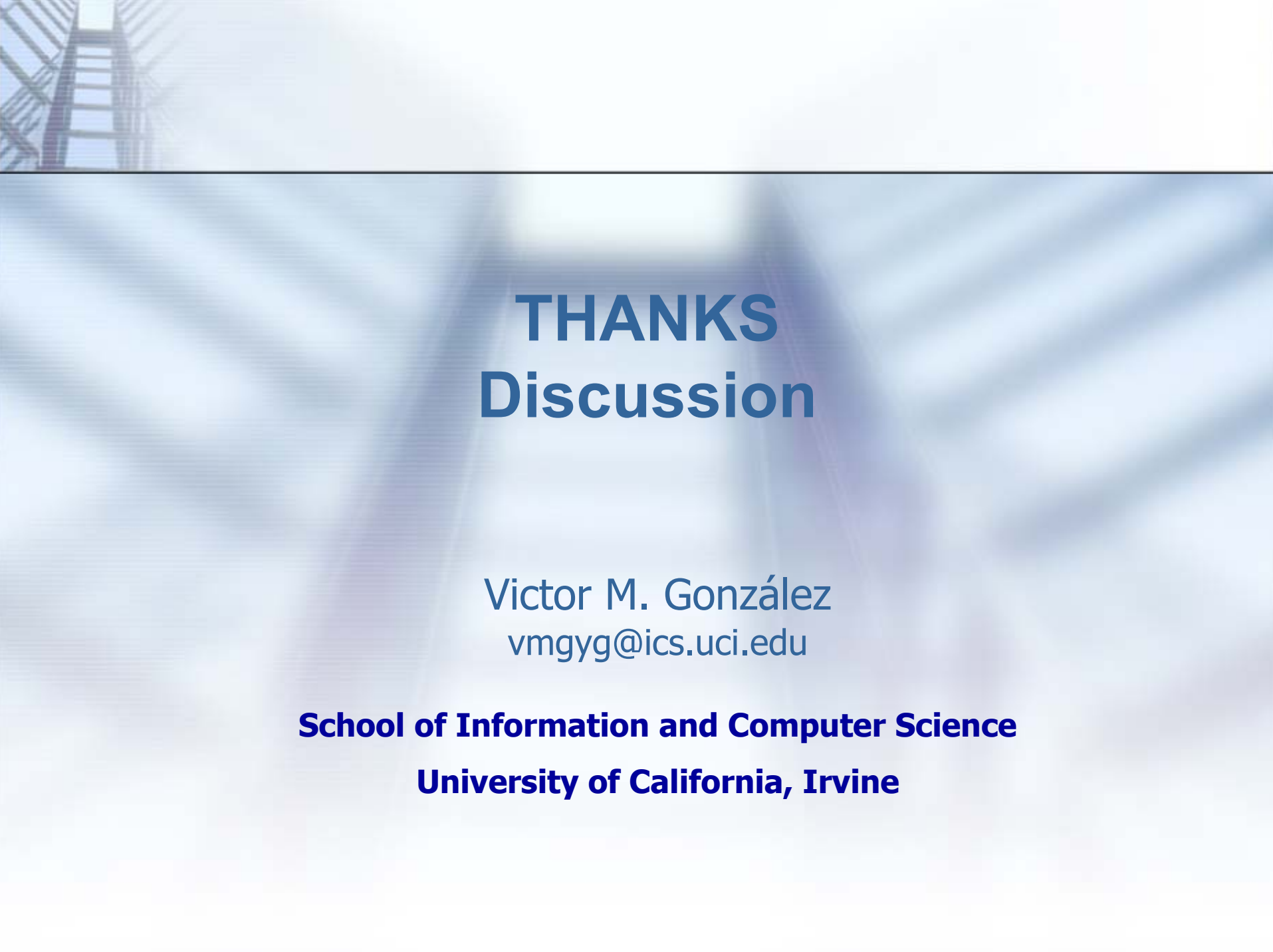
- ⌚ Looking at activities as working spheres let us understand from the individual's perspective and the *state* of the activity at a certain point of time.
- ⌚ The evolutionary process of each activity can be described as a *trajectory*: “*as a course of action which embraces the interaction of multiple actors and the contingencies that may be unanticipated and not entirely manageable*” [Strauss]
- ⌚ Activity management in the long term consist on the handling of different working sphere trajectories, each with its own time frame, each with each own constellations of people and resources, and each evolving as the individual discover its meaning and the ways to get it done.
- ⌚ The role of information technology becomes one of providing enough cues for those pending working sphere trajectories

Element: activities as trajectories



Work ahead

- ⌚ Consolidation of a grounded theory
 - ⌚ Consolidation of categories around elements
 - ⌚ Definition of propositions
 - ⌚ Second workplace study (different context)
- ⌚ IT development using the conceptual framework
 - ⌚ Support for constant switching
 - ⌚ Project Management vs. W.S. management
 - ⌚ Integration of digital and physical resources for activity management



THANKS Discussion

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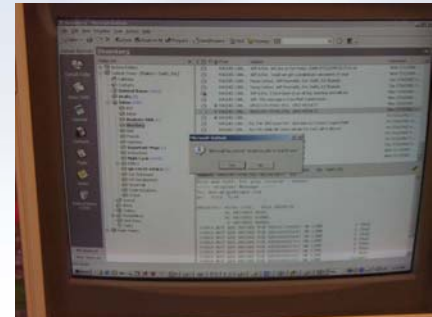
Activity management in situ

- The challenge for information workers is then to keep constantly aware of those working sphere trajectories that they are handling.
- While it is clear that no single artifact support activity management in the long and medium term, when people experience fast-pace conditions and have to interleave quickly across different working spheres, we identified some artifacts that play a stronger role helping people to prioritize and maintain their attention over their working spheres.
- Artifacts act as containers of information that both signals the working sphere to be attended and describes with some detail what has to be remembered.
- “To be attended” Inboxes, piles of email print outs, lines of Post-it notes or sections of daily planners are used across the day (or the week) to record the progress or status of working spheres.

Activity management in situ

The strategies used by people share some characteristics:

- They result from an explicit effort to help organize the work that has to be done, and therefore information related to different working spheres is aggregated into a single type of artifact.
- The prioritization of working spheres is not something that is explicitly indicated in the artifacts: “Important things to be done”.
- Artifacts always appear in a visible spot of the working space so they can be consulted constantly.
- Working spheres remain in the artifact just for the time that they remain “active”.



Working Sphere statistics

Type of WS	Condition	Average WS p/ day (sd)	Av. Time p/ WS (sd)	Av. Time p/ segment (sd)
Central	Default	5.00 (1.90)	0:46:57 (1:02:40)	0:12:52 (0:11:41)
	Urgent	1.00 (1.15)	0:39:38 (0:45:45)	0:15:42 (0:11:01)
Peripheral	Default	2.90 (1.76)	0:15:10 (0:22:02)	0:08:53 (0:09:26)
	Urgent	0.90 (1.10)	0:11:40 (0:11:03)	0:07:16 (0:07:14)
Metawork	--	1 (0.0)	0:44:29 (0:29:34)	0:06:22 (0:03:59)
Personal	--	1 (0.0)	1:05:13 (0:32:48)	0:48:38 (0:30:13)
Unknown	--	1 (0.0)	1:22:24 (0:55:31)	0:12:00 (0:10:06)
Central and Peripheral WS only		9.81 (3.39)	0:33:32 (0:50:59)	0:11:28 (0:10:54)
All	All	12.81 (3.39)	0:40:41 (0:50:58)	0:13:49 (0:16:14)

Event time distribution

Event	% entire day	Avg. Time/Day (sd)	Avg. Time/ Event (sd)
Using phone ¹	5.83	0:30:22 (0:19:14)	0:02:25 (0:00:42)
Using email	9.17	0:47:46 (0:21:18)	0:02:22 (0:00:27)
Using PCs ²	29.48	2:33:36 (1:11:23)	0:02:53 (0:01:10)
Using paper documents/books	6.80	0:35:25 (0:29:48)	0:01:47 (0:00:31)
Using other tools ³	0.31	0:01:38 (0:03:08)	0:01:04 (0:00:15)
Talking through the walls	2.94	0:15:18 (0:14:12)	0:01:40 (0:00:24)
Interacting with people / own cubicle	6.88	0:35:53 (0:29:25)	0:03:34 (0:01:57)
Formal meetings	14.39	1:14:58 (1:17:40)	0:41:47 (0:12:46)
Going to other cubicles	9.11	0:47:29 (0:27:21)	0:07:37 (0:03:24)
Other (unknown, personal)	15.09	1:18:39 (0:34:26)	0:17:27 (0:06:27)
All events except “Formal meetings” and “Other”	70.52%	0:45:56 (0:52:03)	0:03:08 (0:02:27)
All events total	100%	0:52:07 (0:55:25)	0:08:55 (0:13:23)

¹ Includes time spent on cell phones

² Includes both PC and financial terminal

³ Other tools include: handheld calculator, planners, and address books

Technology usage

Device	% entire day	% of device usage only	Avg. Time/ Day (sd)	Avg. Time/ Event (sd)
PC	37.01	72.37	3:12:52 (1:13:48)	0:02:52 (0:00:51)
Financial terminals ¹	1.64	3.19	0:16:59 (0:13:13)	0:01:20 (0:00:36)
Paper documents and formats	5.01	8.92	0:26:06 (0:22:21)	0:01:33 (0:00:28)
Books, manual and other references	1.79	3.50	0:09:20 (0:12:16)	0:01:57 (0:00:55)
Hand-held calculator	0.05	0.10	0:01:13 (0:01:29)	0:00:48 (0:00:18)
Daily-Monthly planner	0.19	0.38	0:04:40 (0:04:18)	0:00:50 (0:00:15)
Address books	0.07	0.14	0:01:45 (0:03:04)	0:01:00 (0:00:42)
Phone unit	5.16	10.08	0:26:52 (0:18:23)	0:02:17 (0:00:43)
Cell Phone	0.67	1.31	0:04:53 (0:06:06)	0:04:13 (0:04:24)
All devices	51.59%	100%	0:44:57 (1:13:27)	0:02:11 (0:01:52)

1. Only seven informants have Financial terminals

Our study vs. others

	% time	Avg. time/day (s.d.)	Horne ^a 1965	Minzt-berg ^a 1970	Sproull ^a 1984	Hudson ^b 2002
Desk work	36.6	3:10:40 (1:22:51)	26%	22%	19%	42%
Phone ¹	5.8	0:30:22 (0:19:14)	9	6	13	
E-mail	9.2	0:47:46 (0:21:18)				
Sched-uled meetings	14.4	1:14:58 (1:17:40)	10	59	34	27
Unsched-uled meetings	18.9	1:38:40 (0:40:31)	55	10	34	19
Other	15.1	1:18:39 (0:34:26)		3		
Total	100%	8:41:05 (1:03:08)	100%	100%	100%	88%²

^a Pre-email study ^b Post-email study

¹ Includes time spent on cell phones

² For this study 12% of the time subjects were “to busy to respond”

Always interacting

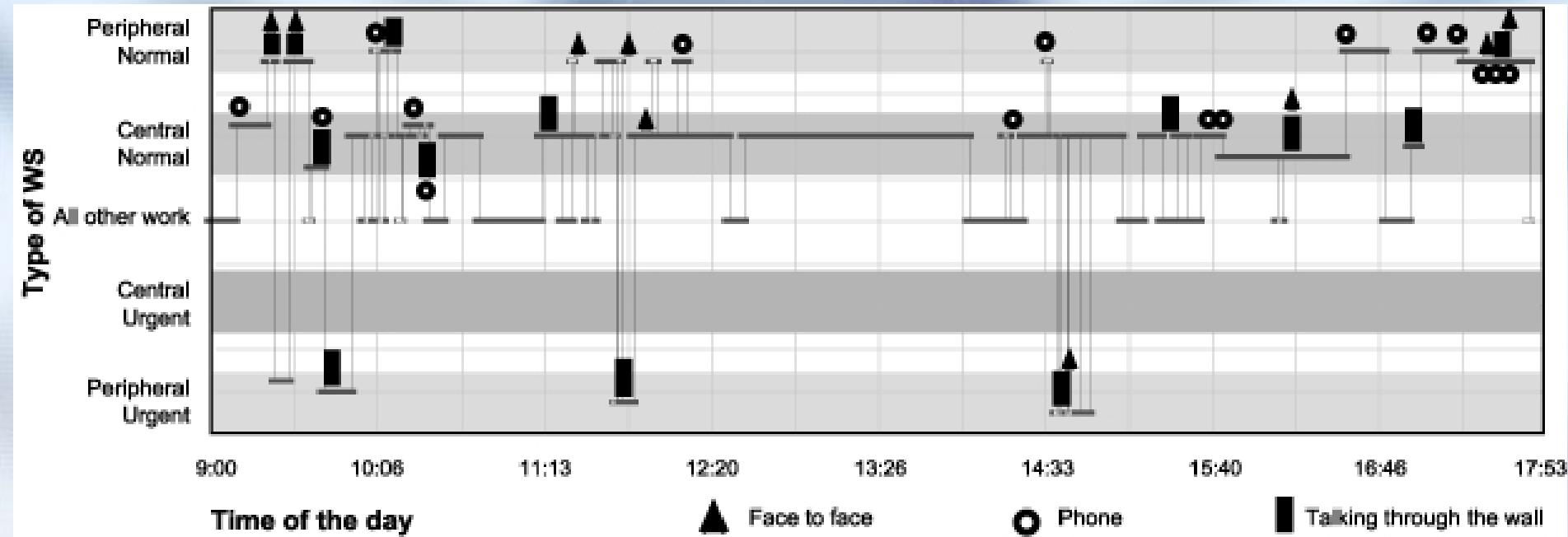


Figure: An analyst's timeline of working spheres