SOME THINGS I TEND TO OVERLAP EVEN IF NOT NECESSARY. A DISCUSSION ON PIM ARTIFACTS BETWEEN RESEARCHER AND RESEARCH AGENT

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ABSTRACT

The spread of mobile communications and IT artifacts in general, gives rise to a pervasive number of mobile working modalities, inducing transformations in social practices and organizational environments in a networked society. In order to design information systems we need to understand how information artifacts are used to get work done, and how these support work, inside and outside the organizations. By drawing on personal information management studies, information needs, and information-related myths, we built a qualitative study to uncover artifacts used to cross different information spaces, by different individuals, in different working contexts, over three years. The present case follows an approach built by researcher and research agent, across different information spaces, where we confronted the existing body of knowledge with empirical data collected. The first results show that permanent reconfigurations of working spaces beyond organizational boundaries are supported by deliberate mixes of information artifacts, that seem to be determined by familiarity with place, anticipation of needs, type of transportation used, distance and time covered, and access issues.

1. INTRODUCTION

Information systems (IS) deal with "the interactions between people and organizations, and technology" (Elliot and Avison, 2005: 189), where people behavior determines IS development, acquisition and support. What do we know about the information artifacts that individuals are (actually) using in their working practices, across time? How do they use them? Why? How do they connect to the larger information systems (IS) of the organizations they work for? What should be taken into account when designing IS to support working practices? Choo says that "*learning to be intelligent begins by learning how to manage information*"(1998: 231). This applies equally well for individuals since they are an integral part of the social fabric of organizations, where they manage information all the time (Detlor, 2010), inside and outside the organizational infrastructures.

This paper presents one of the research agents as co-author. Implying a methodological option grounded in a qualitative approach, this work reinforces the need to use slow methods (Law, 2004) to uncover the (otherwise hidden) voice of the agents (Star, 1999). The case is part of a wider research work, where we look into patterns of artifacts used for working spaces reconfiguration. The use of artifacts - information and communication technologies (ICT) and non-ICT artifacts (i.e. paper notebooks, post-its, agendas, books, etc.) – that individuals carry with them, enable this reconfigurations that take place across working contexts, extending their capacity to access information. A longitudinal design was drawn, aiming for three work settings: organizational, home and *on the move* working spaces.

The paper structures follows with a literature review – myths about information, calling the attention to the body of work from information needs and behaviors and PIM. Then, we describe the qualitative methodological options, followed by the discussion and presentation of the results. The last section presents the general conclusions of the study.

2.   MYTHS ABOUT INFORMATION

Case (2012) calls our attention on a number of myths as unfounded common sense assumptions related to information seeking and needs. This myths include that only the so-called objective information is valuable, though in fact people usually choose the first acceptable solution; the supposition that more information is better, when in fact there is a problem of information overload (Eppler and Mengis, 2004); believing that de-contextualization of information does not affect objectivity, though in fact we verify that context is indispensable; considering that "information can only be acquired through formal sources" (Case, 2012: 8), though it is proven that not only we choose, but we keep qualified information sources that give us good enough information informally. The belief in the existence of relevant information for every necessity, though in fact many human needs are not fulfilled by information; the belief that for every solicitation there is a way to get information or making it accessible, though that is not exactly so, as the availability of information, must mind the systems' limits; the fulfillment of informational needs being done by functional portions pre-defined, though logics of usability, accessibility, and other determine the amount of information we are offered, which might not correspond to the exact amount we use (Case, 2012); the impossibility of ignoring time and space and, finally, the fact that connections among available information and that to be acquired are just not free of contingency. All these issues related to information behavior and use, can be critical for the present work, as people have to address a growing complexity when dealing with different artifacts and information spaces (infospaces), while *on the move*.

The spread of mobile communications and wireless artifacts (Katz and Aakhus, 2006; Lindroth and Berquist, 2008), accompanied by new forms of mobility (Cresswell, 2006; Elliott and Urry, 2010) and an overabundance of information, are challenging organizations (Edmunds and Morris, 2000; Tungare, 2009; Strother, Ulijn and Fazal, 2012) and individuals (Kakihara, 2003; Eppler and Mengis, 2004; Bawden and Robinson, 2009). In fact, mobility shows a specific pervasive working modality, related not only to geographical movement but also to work and business operational flexibility (Kakihara, 2003). Mobility is also related to the interaction among several mobile working professionals in the organization (Kakihara, 2003).

2.1 A lasting vision

For the *Arpanet Users Interest Working Group*, PIM was already a concern, as seen on the minutes of the meeting, held in Boston, in 1973. To this day, not only individual interaction with ICT artifacts has multiplied, as the *memex* vision is still to find its way (Nyce and Kahn, 1991). The pervasiveness of technological artifacts (Walsham, 2012) and the possibility to solve some problems gave rise to new ones, namely: fragmentation of information, problems of interoperability between applications, information locked in applications, multiplicity of communication channels, backing up information from all the paraphernalia of artifacts, and need for growing technological and literacy skills. These are *just* some of the issues facing individuals inside and outside the organizational walls (Tungare, 2009).

2.2 Personal information management issues

Growing informational needs for each individual are linked to information management skills (Case, 2012), and related to the management of personal information (Jones, 2007; Whittaker, 2011). These have been addressed through user-centered approaches related to each individual's ability to manage and optimize resources. These approaches relate to organizational performance, implying the ability to collaborate (Sonnenwald, 2007), constant information sharing, and feeding the organization information system. PIM crosses diverse scientific fields and enlightens our understanding of

> *"both the practice and the study of the activities a person performs in order to acquire or create, store, organize, maintain, retrieve, use, and distribute the information needed to complete tasks (…), in which information items, such as paper documents, electronic documents, e-mail messages, web references, and handwritten notes, are stored for later use and repeated use.""* (Jones, 2007: 453).

But while Jones (2007) focus on PIM is consumption and discovery, Whittaker develops the curation approach: "(...) *curation includes "new technologies— such as ubiquitous sensors, digital video and digital cameras*" (Whittaker, 2011: 6), enabling the capture of new data. The whole tendency allows for a more significant amount of information, cheaper, and widespread manipulation of significant collections in memory support systems such as hard drives or USB pen drives. He proposes the replacement of Jones' personal information seeking by a set of "(...) *future oriented* activities, more specifically the set of practices that select, maintain, and manage information in ways that are intended to promote future consumption of that information." (Whittaker, 2011: 7). This notion of a future oriented activity has been approached by information management long time before. Wilson (1994) signals studies on how people behave as they seek and use information as far as 1948. Information seeking models tell us about our information needs, considering what we do is to use, preserve and re-use the information already retrieved (Whittaker, 2011; Case 2012). The author mentions studies concerned not just with seeking and retrieving but also with re-access issues. So being, Whittaker proposal for curation instead of Jones' consumption implies a set of practices and behaviors also researched by information science authors, such as those described in the three curation lifecycles:

a) Keeping (for re-use). Though Jones (2007) and Jones and Teevan (2007) tell us about (re) finding information, the approach proposed by Whittaker seems to establish, only the first phase on keeping (Whittaker, 2011), a phase also existent in the previous authors approach. Foraging is included as means to re-access.

b) Whittaker tells us about managing (for future consumption), in relation to what Jones (2007) and Jones and Teevan (2007) define as *metalevel activities*, meaning management and maintaining information activities which can include maintenance and selection. Case (2012) refers to *keep things in order*, as in the Savolainen information seeking model (Savolainen, 2005);

c) Exploitation is a phase or process without exact parallel in Jones (2007) or Jones and Teevan's (2007) approach, but is clearly directed to re-access and re-use, including that future oriented perspective that Choo, as Whittaker, refer to.

All these phases seem related to informational and technological literacy, access to information, which are complementary defined by social and contextual factors such as literacy, resource availability, specifics related to different professionals and mobility issues. Contextuality determines interaction, either recurring or not to information artifacts. Kakihara and Sorensen (2001) address mobility through three dimensions (spatial, temporal and contextual), which Authors locate as the core of ICT use contingencies.

3. METHODOLOGIES AND AFTER METHOD

To "find solutions to organizational needs in using information systems and technology" (Bacon and Fitzgerald, 2001: 50), it is important to draw on methods that respond to the *how* and *why* questions addressing the ways people connect to IS through information artifacts, embedded in their working practices. Law calls it "slow methods" (2004: 15). As stated by Kakihara "dynamic interactions between action and context through an ongoing process of practice needs to be addressed" (2003: 62). The *hows* and *whys* call for a qualitative research approach (Lee and Baskerville, 2003; Yin, 2009), already well established in IS field (Walsham, 2006).

Following a case study research design (Yin, 2009), the main phases were: a) observing individual practices in work contexts; b) reviewing literature with a focus on PIM artifacts; c) observation using field note taking and visual records (Rose, 2008; Pink, 2009; Mitchell, 2011). As theory and epistemological issues were reviewed and confronted with observation, it became evident that the adequacy of a qualitative

approach as the one chosen, implied also an after-method review (Law, 2004). This article is the result of a discussion among researcher (Author1) and research agent (Author2), on previous collected data. As a process of after method review it adds internal validation to the case. This in turn, allowed insights about the interplay of ICT and other information artifacts, like paper, among diverse individuals in real working contexts. Research phases included:

    a) Empirical data collection from 13 cases, in the course of three years, following theoretical sampling criteria (Patton, 2002; Fletcher and Plakoyiannaki, 2010), aiming for real life work situations, across diverse professional activities, varying the granularity of the observations. The study design was mainly informed by *methods assemblage* (Law, 2004), calling upon different fieldwork methods used for observation (artifacts used, notes, visual records) and participant observation. The photos and images were framed by the researcher (an *etic* view) and by agents in the study (an *emic* view). To guide observation, the researcher focused on artifacts, while performing work in different locations (as seen in Table 1 and 2).

    b) While conducting the cases, the researcher aimed for an in-depth study during 1 year: 1 of the 13 cases was selected, informed by ethnographic practices, which have proven richly suited in IS field (Star, 2002). Collected images are an integrant part of the research data (Banks, 2008; Hartel and Thomson, 2011).

Information gathered was organized by data sets comprising images, photos, field notes, voice recording, and information collected through interactions with agents. This enables content mobilization according to each case. The approach has to do with the specifics of information collected, calling for different archival concerns, preparation and treatment necessary for analysis. Contrary to what happens in quantitative, qualitative studies create even more data during analysis.

The process of analysis consists of questioning the data (open coding, memo writing, selection of themes, focused coding, and integrating memos) (Saldaña, 2009), as seen in tables 1 and 2. We are following the iterative nature of case study research, for a theory-building structure (Yin, 2009:175-178). Field notes' processing and information exchanged with agents are being carried according to ethnography writing as an analytic process (Emerson, Fretz and Shaw, 1995; Angrosino, 2007). Visual analysis requires additional efforts to integrate with the rest of the information, namely the need to situate them and explicit the context of capture (Rose, 2008). Photos are integrated with other accounts without demoting them as mere narratives and illustrations (Pink, 2009). Search for regularities, patterns and negative evidence allows the emergence, refinement and robustness of propositions confronted with literature.

4. DISCUSSION AND RESULTS: RECONFIGURING SPACES

The present case relates to a female individual considered a mobile worker, being simultaneously a professor in a higher education institution, a technical worker in a government agency and also a PhD student. The later, considered as work also. For this research agent, PIM is organized according to memory filling:

> *"My memory serves me to know which type of information I kept in the hard drive that I carry, or other that I know it's in the School small green pen drive, another that I know I have in my [laptop], now that I have things stabilized on the drive of [husband] that works as a server in the house; As norm (...) I have to combine 3 places so different (...). Some things I tend to overlap even if not necessary, so I do not forget during the transitions."*

Discussion over observation made through the present case gave way to a series of dimensions, based on the two previous referred tables and enabling a basis for other cases' analysis. Dimensions were built as follows:

Artifacts bridging infospaces for articulating work. Organizational infrastructures create constrains that are time consuming and give way to strategies of «getting around the system»: *"[mind maps] are normally transformed in pdf because the school does not have [the software needed to use them] (...)" (Tab.1)*. The use of self owned artifacts to get work done (inside or outside the organization) reflects and is reflected by

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TABLE 1. Artifacts visible in different working spaces

Artifacts	Home	Higher Ed. Institution: "I keep on being able to use the same type of artifacts that I got used to. At School I can exchange artifacts and make experiences as I wish (…) either you call it software, or anything more physical."	Organization: "Imagine a square with an island of desks in the middle - four desks – and then, all around the room you have files." At my right a group of shelves, covered by yellow files. (…) At my back, there are red files (…)."	[PhD University]: Artifacts always carried to University, "The drive, the mobile [computer], the pen."
Digital information	"I have an archive. It's mainly a digital archive because I ask them [students] to send me their assignments by email. (…) I see the assignments in pdf. (…) and they stay in my disk."		"Everything in digital format... has little value. (…) the entire Organization works with reference to paper."	
mind maps	"[T]hey are normally transformed in pdf because the school does not have [the software needed to use them] (…) "and, as a backup, I use my [mobile] computer."			
ppt / slides		"If I have ppt [slides] they are only shared in paper (…) it's an established practice beyond me."		
CMap			"had to ask authorization to IT to download the software (…) download is made by the system administrator. It's a security procedure"	
Pdf	"I see the [student's] assignments in pdf".	"If I have texts to share I send them in pdf."		
Email accounts	"Have a NetCabo account that is set to forward all the email to Gmail."	"I ask them [students] to send me their assignments by email."	"The webmail is not set as mandatory but as something that can be used".	"I have the one from [PhD University] but that one I do not use."
USB pen	"Have a pen that is used to carry the materials I'm going to use with the students in classes"		"The pen was given to me by the [Organization]"	"I also carry the pen with me always."
Computer	"Normally I take all the work ready from home [to School]."	"There's a computer in my office room but I haven't used it yet."	"I have a fixed computer … what you could call a terminal"	
Mobile computer	"I download the assignments and they stay in my disk."	"I use the computer to access internet at school and to work between classes."	"I never use my computer [at the Organization] (…) "I only take my computer (…) if I'm going to [give classes]"	"I have a backup in the hard drive."
Hard drive	"we broke two hard drives (…) but I didn't lost any information because I have it in many places"			
Mobile phone	"Today I'm not carrying the mobile phone charger… neither my mobile. I bring [husband] phone because mine run out of battery. Normally I carry mobile and charger. (…) But not always."			
Printers			"We have one in the room and then there is another in other room. The photocopy room. We have access to both but normally we forward it to ours because it's near."	
Notebook	"It must be one of the more unstable objects that I use. Because I'm always changing the sheets from their source."			
Dossiers	"I have two dossiers, something that I forgot to talk, that I take to classes."	"It has all the lectures I've given since the beginning of the [academic] year, with all the materials I've used, the students that where present, class plans, the syllabus (…)" everything that's paper (…)."		
Photocopies		"I have a card to make photocopies. (…) I'm always taking texts for the students to work."		
Agenda		"I'm using a [paper] agenda. The School gave it to me. (…) I write the summaries in it. I'm doing it for the first time this year."		
Paper		"I distribute paper for student's work [in classes] (…).it assures that, in that class, in that moment, they all have the same information in order to work in a given task."	In order to obtain authorization for installing software, "Paper. A memo. I had to do a word text (…) to justify [CMap] utility. (…) After 15 days [it] was authorized."	

TABLE 2. Artifacts visible on the move

1. Organization to Event: Agent's information artifacts mingled with others. Short commute by car.	2. Agent's bag on arrival at airport. Move by plane, long distance, five days away.

PIM practices. Permanent *reconfigurations of working spaces* beyond organizational boundaries are supported by deliberate mix of information artifacts: *"(...) because I have to combine 3 places so different – School, [Organization] and University" (Tab1 and Tab2)*. Apart from individual work characteristics, this mix seems to be determined by: a) familiar or unfamiliar places: *"I didn't lost any information because I have information in many places (...)" (Tab1)*; b) anticipation of needs: *"By being made available to all them [students] it assures that, in that class, in that moment, they all have the same information in order to work in a given task(...)" (Tab1)*; c) transportation used for physical mobility (travel) (Tab2); d) distance covered; and e) duration of travel; f) access: *"the keys, because they give access to the professors lift and to my office room" (Tab1)*. Paper is widely used as note taking, reminder, build work memos, to exchange information and as temporary medium holding co-constructed collaborative work for later incorporation in other artifacts (Tab2). Authors refer these as paper affordances (Sellen and Harper, 2001; Suchman, 2006).

Mobility induces the need of information access through artifacts. We can face difficulties in accessing information (Case 2012). Star and Ruhleder (1996) demonstrate the relevance of access through infrastructure and infospaces access, and "informal and formal communication and data access across many sites" (Star and Ruhleder, 1996: 114). Kakihara (2003) refers that for mobile professionals accessibility is crucial and strictly related to multiple accesses, meaning information, infrastructures (Tab2), space, working communities, communication among colleagues and so on: *"Today I'm not carrying the mobile phone charger… neither my mobile. I bring [husband] phone because mine run out of battery. Normally I carry mobile and charger"(Tab1)*.

Through artifacts infospaces are reconfigured. Beside the function played by paper in articulating work, sharing ideas (Tab2), and bridging what points to existing gaps, more still needs to be understood, namely between individual ICT artifacts used and the larger IS in organizations designed to support work: *"Paper. A memo. I had to do a word text (...) to justify [Cmap software] utility."(Tab1)*.

5. CONCLUSIONS

Frequent problems detected included incompatibility with information files, not enough power and network sockets for all ICT used, and different security network configurations delaying or invalidating artifact use. Incorporating learning practices at organizational level is partially based on individual management style but also, to a great extent, dependent on individual initiatives. Different individual strategies include self-owned wireless, extra care to bring additional sockets/ adaptors, preparing and sending presentations in advance and installing new software on self owned ICT.

Apart from cultural or information power issues that may exist (Komito, 2009), what we have seen here reinforces the paperless office as a mythical conception (Sellen and Harper, 2003) and contradicts the idea that we should aim for technological solutions substituting paper artifacts for digital and technological equivalent. Paper is manipulated and re-created, no matter the sophistication of ICT artifacts used, in spite of the diverse roles and situations at play in different infospaces (in organizations, on the move, at home).

When we talk about space assemblage, we mean reconfiguration of spaces *on the go*: the mobile office is in fact a reconfigured space where some invisible work (Star and Strauss, 1999) can get done in between other tasks. This becomes temporarily visible on *datasets* (Yin, 2009) (Tab1 and 2). If initially access to a private archive can be a paradox (private turned public), space reconfiguration can induce this mix through its recreation, enabling some information continuity. Artifacts become adapted: laptops gain comfort appendixes such as a pillow or wood board, adapting them to particular spaces, enabling work in the auto or the sofa.

Increased use of technological artifacts also adds layers of dependency: we depend more and more on enabling information artifacts to travel with us, for instance, ensuring electrical connection, in order to make our information structure immediately available. This seems to force individuals to use not a pen or a hard drive, but the very laptop through which allow accessing information in the hard drive. This calls our attention to the sudden visibility of infrastructure: whenever it fails it becomes visible (Star and Ruhleder, 1996:113). Sets of things establish our infrastructure, such as network information, digital and physical information (on paper, for instance).

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