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# Organizational Space Collapsed, Organizational Space Expanded: Experiencing Space with ICT, Affordance and the Body

Anouk Mukherjee

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# THÈSE DE DOCTORAT

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Préparée à l'Université Paris-Dauphine

## Organizational Space Collapsed, Organizational Space Expanded: Experiencing Space with ICT, Affordance and the Body

École Doctorale de Dauphine — ED 543

Spécialité Sciences de gestion

Soutenue le **23.06.2017**  
par **Anouk MUKHERJEE**

Dirigée par **F-X de Vaujany**

### COMPOSITION DU JURY :

M. François-Xavier De Vaujany  
Université Paris-Dauphine  
Directeur de thèse

Mme Cécile Godé  
Université Aix-Marseille – FEG  
Rapporteure

Mme Jessie Pallud  
École de Management de Strasbourg  
Rapporteure

M. Christophe Elie-Dit-Cosaque  
Université Paris-Dauphine  
Président du jury

M. Stewart Clegg  
University of Technology Sydney  
Membre du jury



École doctorale de Dauphine

DRM UMR CNRS 7088

**Organizational Space Collapsed, Organizational Space Expanded: Experiencing  
Space with ICT, Affordance and the Body**

**Anouk Mukherjee**

UNIVERSITÉ PARIS-DAUPHINE NEITHER APPROVES NOR DISAPPROVES THE  
OPINIONS EXPRESSED IN THIS DISSERTATION; THEY SHOULD BE CONSIDERED THE  
AUTHOR'S OWN

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## 1 General Introduction

Where am I? Really, where am I? Where am I when I'm texting while walking? Where am I when I'm sitting in front of my computer surfing the Internet? Am I here or in cyberspace? What is cyberspace and why do I feel like I'm not really 'here' when I'm involved in these activities? How does technology change the experience of space?

These reflexive questions are at the origin of this project. Behind the seemingly casual nature of these questions, is the feeling of experiencing something profoundly different with regards to space when I'm engaged in these activities. Spending long hours in front of a screen working on text and images, I seem to forget the world around me. Although reading a good book gives me the same impression, the experience with technology is comparatively profoundly unsettling. My body is not adopting the same posture as when I'm reading a book or even writing. My senses are orientated differently. I find myself absorbed, yet perpetually unsatisfied. I click, type, swipe for hours. When I get up, I am surprised to find myself re-introduced to another world. One with a desk, a chair, books, papers ... a room. Where was I during all those hours, and how could I have been so disconnected from my immediate physical environment? I just realize I had a journal article sitting on my desk right under my nose that I've been searching for weeks for. Yet I manipulated with ease the keyboard and mouse, and would be able to grab my mug of coffee without taking my eyes off the screen. It was as if my body could merge the world inside the screen with that of my immediate surroundings into a single sphere of experience. Habit would ensure none of this felt strange or surreal. It was perfectly normal to have a single unitary embodied experience both inside the screen and inside the room.

Although these questions emerged from my personal experience, I was convinced they were of significant relevance to not only my peers, but also the wider public – especially those who work in offices. Our world is dominated by screens. We look at one all day at the office, and, increasingly, we look at one on the commute to and from work, in the kitchen, in bed – anywhere really. Why do we spend so many hours of our lives staring at a screen? Why is it that we can't stop? How does this experience compare to that of reading a book or just simply walking down the street without a screen to stare at?

We are all familiar with the narrative that ICT has transformed our world, brought us closer together and made our lives easier. We can now send letters online without having to step out of the house (email and digital post). We can order grocery online and have it delivered to our doorstep. The list is endless, and would bore any reader to death given how banal these realities of contemporary life are. We seem to be no longer bound to physical distance like we used to be. We can send information across the space-time continuum instantly and get access to human knowledge through just a few clicks and finger strokes. What has this done to space? Has it really brought us closer together? We seem to be just as far apart, at least physically, as we used to be. Has physical distance been made irrelevant? I still struggle, like most commuters, to get around the city, and when there is a problem on the train line, there is no app on my tablet which could teleport me to my destination.

The reality is that we are just as bound to our physical environment through our bodies as we have ever been. Yet we often entertain notions of being able to somehow transcend our bodies and space with the help of ICT. We can now speak of friends we haven't seen for years because we are up-to-date on their latest news, thanks to social media, as if we had seen them for dinner the previous evening. We can follow in real-time the travel adventures of friends and family half-way across the planet, as if we were with them. All of those of a certain age are aware of how ICT has changed our experience such that we feel like we can now access a much bigger world from just sitting in front of our computer. Do we live in an era of shrinking space? Or of the expansion of it?

Organizational life is just as affected. The experience of workers is disrupted by the ever-increasing intensity of interactions with ICT artefacts. How does the worker experience space in these conditions? How do workers interact with the immediate physical environment when they are staring at their screens? How is the experience of space produced, and what is the role of ICT in producing it?

Architecture, urban planning, ergonomics and interior design are fields concerned with how our bodies move in space. But they are also concerned with how we experience space. The space of cities, buildings and workstations. Much research has been conducted to understand our experience of moving through the city and inside

buildings. But, how is this experience affected by the hours staring at a screen? Is the experience of organizational space transformed by ICT? Does it make space less relevant? Can we just have virtual offices and no fixed workstations? Some seem to think so – or at least used to:

Just as the personal computer revolutionized the workplace throughout the 1980s and 1990s, recent developments in information and communication technology are on the verge of creating a new revolution in the coming decade. A group of technologies, including desktop video conferencing, collaborative software, and Internet/Intranet systems, converge to forge the foundation of a new workplace. This new workplace will be unrestrained by geography, time, and organizational boundaries; it will be a virtual workplace, where productivity, flexibility, and collaboration will reach unprecedented new levels. (Townsend, DeMarie, & Hendrickson, 1998: 17)

Although spatial reality in 2017 hasn't completely lived up to the expectations expressed by the authors, we still feel this enthusiasm for the new workplace unbound from its traditional boundaries based on geography, or time. It suffices to perform an image search in Google on the term "work anywhere". We find our screen inundated with images portraying happy workers sitting with a laptop in the most unlikely of places – a deserted beach, a mountaintop or a forest. Ridiculous? Perhaps. But what this reveals is that the vision expressed by Townsend, DeMarie & Hendrickson still stirs the imaginary. The liberation from the 9 to 5 rat race grind is just a question of good Wi-Fi and decent weather. But nobody is fooled.

What is it about ICT that could have the potential to transform organizational space to the extent of almost vaporizing it? What compels scholar Bill Mitchell to speak of the 'anti-spatial' nature of ICT (1995), and authors Frances Cairncross and Thomas Friedman to announce 'the death of distance' (2001) and that the world is flat (2007)? The geographer Stephen Graham believes this discourse is the product of the dominant cultural assumptions of the West where technology effects change in a linear and predictable manner (1998). This technological determinism, he says, presents an obstacle for the advancement of understanding the relationship between technology and space.

The importance of unpacking and understanding the relationship between ICT and space is imperative. For organizational space, much is at stake. Office spaces, factory

floors and laboratories still constitute the primary physical context of economic activity (Jones, 2009). The building of these physical organizational spaces represents a very large share of the 3-trillion USD global construction industry (International Labour Office, 2001). This total figure is close to the 2015 GDP figure for the United Kingdom. Another more recent study from 2011 puts the average cost of a workstation in Paris at 15,000€ (Nappi-Choule, 2011). Any experienced office worker will tell you stories of struggle for finding an available meeting room, an office that's not too close to the elevator – yet close enough to the coffee machine and toilets, a seat in the cafeteria at noon, an optimal route into work in the morning, a way to avoid passing in front of the boss's office when you're late, a parking spot close to the door for when you're in a hurry, etc. This is the reality of the experience of being an office worker, and has everything to do with organizational space.

Organizational studies have been interested in space for some time (Clegg & Kornberger, 2006; Dale & Burrell, 2007; Hernes, 2004; Warf, 2009) and this has produced an accumulation of scholarly knowledge (Taylor & Spicer, 2007). This body of knowledge has drawn on several philosophical roots, most notably Cartesianism, Marxism and Phenomenology. In stark contrast, however, is the absence of cumulative knowledge on organizational space in the IS literature. IS scholars – strictly speaking – seem to have little interest in the spatial reality of office workers. It is mostly assumed that the prophecy announced by Townsend, DeMarie & Hendrickson is just a question of effective use of ICT. This is especially surprising given how much space remains an intractable problem for organizations regardless of how effectively ICT is used. IS scholars should display more interest, especially given the number of hours workers spend immersed in their screens. Researchers in other areas have shown more interest, and space is often implicit in research dealing with technology. We see this in Human-Computer Interaction (HCI), Mobility Studies, Teleworking studies, Telecommuting Studies, and Haptic Systems Studies for example. But even in these cases, organizational space is not an explicit object of study. Evidence of this is in the fact that almost none of the studies of this kind draw on the organizational space theory. There is therefore a tremendous lack of scholarly understanding about the relationship between organizational space and ICT. The objective of this empirical study is to make both a theoretical contribution to scholarly knowledge on this relationship, but also sketch

some promising avenues for future research. It also provides practical insights for practitioners such as architects, urban planners, designers and managers.

To accomplish this, we will explore and unpack the spatial practices of academics in two business schools. The object of study will be the spatial practices of academics with a certain focus on ICT. In unpacking these spatial practices, we will understand how the academics experience organizational space every day, and how ICT plays a part in shaping that experience. At the very beginning, a research question was not clearly defined other than understanding the relationship between organizational space and ICT in business schools. After some preliminary fieldwork and a more intense review of the literature, the research question was set as follows: **How does ICT afford the spatial practices of organizations?**

Why study academics in business schools? The first part of the answer is based on the intuition that the specific nature of academic work provides an opportunity to learn about the relationship between ICT and organizational space when workers are relatively socially unbound from any physical locale. When compared to most workers in traditional organizations, academics have a significant degree of freedom in shaping their workaday in time and space. This was not only felt by myself as an academic-in-training, but it was also confirmed by the findings of the study. Being relatively unbound to a physical locale, it was felt that changes to spatial practices that ICT mainly offered through the possibility of mobility would come into sharper focus. This would result in clearer signs of the relationship and improve the quality of the analysis. Should ICT be directly responsible for shifts in spatial practices, it will likely become more apparent compared to an organizational context where spatial practices are somewhat rigidified by social norms and contracts. This point is a methodological consideration, and the variety of spatial practices in the findings suggest it was a good judgement. The second part of the answer is purely pragmatic. Access being one of the biggest challenges for fieldwork, it was felt that targeting an organization such as a higher education institution would reduce the risk of being barred from access. This was an important consideration because it was initially feared the long periods required for ethnographic study would make access a tricky endeavour in private enterprise or government organizations. Higher education was already well known to me and access was

essentially guaranteed. It also offered the possibility of integrating as many as three case institutions for my study. The most obvious would be my home institution, *Université Paris-Dauphine*. Other possibilities included institutions with which I had some connection with, either by being part of their alma mater or contacts through peers. All of the possible cases happened to be business schools or management faculties. Why specifically business schools? Certain recent developments (2014a; 2015), make it increasingly evident that flexible working arrangements are becoming commonplace and the demand for it from workers is on the rise. Such developments point to a shift in the traditional spatial practices of working in an office with a 9 to 5 rhythm during the week. This would mean such flexible arrangements would bring increasing populations of workers towards the spatial practices of business school academics where one could decide to work from home or the office depending on the tasks demanded of them. Business school academics are less bound to physical facilities such as laboratories when compared to the wider academic community. The point of similarity in flexible spatial working arrangements between business academics and those in other activities suggests insights from the world of business schools could be relevant for other types of organizations. Details of this justification can be found in the Research Design section.

Prior to the start of fieldwork, part of the literature was explored in order to gain some theoretical understanding and a footing with which to approach the field. Much of this understanding was mainly based on the well-established literature on organizational space and the work of Henri Lefebvre (1974) upon which much of this literature draws. The notion of spatial practices was very useful in delimiting the object of study. A spatial practice is essentially any practice stripped down to spatial motion and relations. Walking is a spatial practice in that it demands a certain movement from the human body and requires a certain physical environment for it to be possible. It is a practice because walking is a set of movements and relationships repeated over time. A spatial practice in an organization can be walking, but also holding meetings, sitting at a workstation, or gossiping at the coffee machine. However, at this early stage, missing was a way to conceptualize the relationship between ICT and organizational space.

After some preliminary fieldwork to better understand the object of study and further exploration of the literature, the notion of affordance emerged as the most promising

way to conceptualize the relationship between ICT and organizational space. This link was mainly based on the work of Paul Leonardi and his study of computer simulation technology for automotive design (2011). The concept of affordance has its origins in the field of Ecological Psychology with the work of J.J. Gibson, and has been appropriated for the study of technology in many areas, mainly with the objective of improving its design (1988). In this appropriation, affordance conceptualizes the relationship between the physical properties of the environment and the perception of what the environment offers the perceiver in terms of actions. According to this theory, ICT, affords certain possible actions to an individual, and whether these possibilities are perceived or not is dependent on contextual factors such as other environmental properties and the quality of attention of the individual.

A conscious decision was made at the beginning to not limit the study to a specific technological artefact. This was made despite some criticism from peers about the risk of 'black-boxing' technology, a concern raised by many IS scholars (Orlikowski & Iacono, 2001; Weber, 2003). Although these concerns may be valid for many studies of technology, it was felt that it wasn't applicable to a study mobilizing Gibsonian affordance. This notion, as it was originally developed, explicitly eschews the narrowing of affordances to a limited aspect of the environment. ICTs are part of the physical environment and it is the environment as a whole that affords and not each component part affording in isolation. This is one of the critiques of much of the literature in IS mobilizing the theory of affordance. For this study, ICT is never defined as either a specific artefact or function. These are allowed to emerge from the data to reveal how they are embedded in the wider physical environment in the context of a specific practice.

Being initially inspired by Henri Lefebvre's work, no clear epistemological stance emerged at the start of the study. Lefebvre is a Marxist, and as such was principally concerned with questions of spatial power relations and domination. However, his theory – notably the spatial triad – is composed of three components, each representing different epistemological perspectives. In fact, his theory takes as its starting point the human body and it is developed with a sensitivity to phenomenological considerations such as perception and experience. This sensitivity was incorporated into the research

design, with a particular focus on the body. This eventually made possible a phenomenological analysis in the discussion which allowed this study to make a more substantial contribution than otherwise possible. Being an under-theorized area, it was decided at the start of fieldwork to adopt a grounded (not based on Grounded Theory (Glaser & Strauss, 1967)) or abductive stance. Each increment in theoretical understanding originating from the literature or the empirical work would be used to update the model. The evolution of this model is described at the end of the Theory section.

Given the exploratory nature of this study, it was decided to do a qualitative multiple-case study. Qualitative because the relationship between ICT and organizational space is under-theorized and in taking a grounded approach (again, not based on Grounded Theory), a quantitative study would be inappropriate. Based on interviews with academics, direct observation, archives, documents, photographs, physical artefacts and sound recordings, data was coded systematically using the computer assisted qualitative data analysis software NVivo. The coding structures evolved with the analysis and the detail of this process is to be found in the Findings section. Three cases were initially selected for this study, however only two were retained in the end – the Desautels Faculty of Management of McGill University (Montreal, Canada) and the Judge Business School of Cambridge University (UK). Details on these cases and their selection can be found in the Research Design section.

Given the under-theorized nature of the literature informing the research question, it was decided, as part of the research design, to divide the study into two phases for fieldwork – exploratory and intensive. The exploratory phase would allow for a grounded understanding of spatial practices and the development of a robust model which could then be tested and further developed during an intensive phase of fieldwork. Both phases would be divided into two subphases to provide some time for reflection on the data collected up to that point. Both phases of fieldwork were conducted for both cases over a period of approximately 3 years involving 9 separate trips to both sites in Canada and the UK. Each trip was ethnographic in nature, with as much time as possible spent on site making observations and interacting directly with



the community and physical space. Details regarding each phase can be found in the Research Design section.

What is the result of this study asking how ICT affords spatial practices of organizations? After in-depth analysis of the whole corpus of data, we find affordance theory to be inappropriate for not only the study of ICT and spatial practices, but of ICT in general. The manner Gibsonian affordance has been appropriated and mobilized in the IS literature disregards a critical aspect to how individuals perceive their environment – that of prior experience. J.J. Gibson made it clear that his notion of affordance was based on an understanding of visual perception in which the structure of light reflected off objects in the environment contained information which would call for certain actions from the perceiver. This cannot be transposed to ICT due its physical nature separating form from function (Kallinikos, 2012). The findings show a device such as a smartphone doesn't call upon the visual perceiver a set of actions without any prior experience using the functions of the device. It is otherwise, at best, a small hard slab of no immediate obvious use. It is only with prior experience, generating knowledge accumulated over time about the physical environment, that the smartphone comes alive with possibilities. However, this is no longer Gibsonian affordance. As we will see in the Theory section, most studies of ICT mobilizing the notion of affordance fail to recognize this critical aspect of Gibson's theory and instead use the term affordance to in fact mean possibilities of ICT.

While this study fails to answer the research question satisfactorily by mobilizing Gibsonian affordance, further analysis using Merleau-Ponty's phenomenological perception provides a solid theoretical foundation for a future study addressing the same question about the relationship between ICT and organizational space. Merleau-Ponty's phenomenological perception provides us with a set of concepts linking experience with the physical environment. Intentionality, the body schema, the knowing body, and habitus are all at play to produce an experience of space which can occur within the context of a practice. The findings show how academics' experience of space, while engaged in a practice, shapes their bodily movements, and how this in turn shifts their experience. The experience of space is the result of phenomenological engagement of the body in the world, this engagement being directed at a certain physical

environment. This direction of engagement, or posture, is what Merleau-Ponty calls intentionality. The intentionality of an individual will depend on his experience, but also on the practice he is engaged in. For example, an academic reading a journal article on a screen will take on a certain posture associated with reading on a screen establishing a certain bodily relationship with the physical environment. This relationship with the physical environment is established through the body schema. The body schema is the most important notion in Merleau-Ponty's phenomenology because it incorporates the notion of habitus. Habitus connects movements and spatial relationships associated with a specific intentionality and makes them available to the body. It is the repository of renewable action. Merleau-Ponty's habitus allows us to move beyond the limitations of Gibsonian affordance to better understand the relationship between organizational space and ICT. The full reasoning can be found in the discussion at the end of the Findings section.

As a matter of experience, space is not rendered irrelevant with ICT, but rather it is both collapsed and expanded simultaneously. The combination of proximate and remote spaces for a given practice expands the space in the sense that the individual has at hand more space (remote), yet it is collapsed because it is condensed into his experience as being at hand at the same level as proximate space.

This new phenomenological approach based on Merleau-Ponty suggests that it would be more fruitful to study organizational space from the perspective of experience. We suggest drawing from calls for an experiential perspective on computing (Yoo, 2010) and developing the notion of embodiment in the IS literature. We suggest this and other avenues for future research in the discussion.

The findings of this study also lead to some interesting questions about the design of ICT. The observed experiences of academics suggest distraction from ICT is a source of significant frustration. This frustration generates new practices such as working in cafés without Internet connections or placing devices out of sight in order to concentrate. These observations are consistent with the principles of design of ICT, all guided by the objective of maximizing attention (Harris, 2016; Manzerolle, 2014). Each app or device

is therefore competing for the attention of the user with the result of fragmenting this attention and leading to frustration.

This dissertation is the story of a journey. An intellectual one, certainly, but a personal one as well. As an academic-in-training myself, I was able to experience firsthand the life of an academic in a business school. I engage in the same practices – reading, writing and teaching – and inhabit the same world. In a very Bourdieusian sense, I shared the same habitus as my interviewees and was intimately familiar with my object of study. This is both a strength and a weakness. A strength it is in that I was able to quickly interpret the codes and symbols of the academic world without much effort. My previous experience in industry also helped in navigating some of the touchier organizational issues. It is also a strength in that I was able to naturally and reflexively engage in my study, informing the analysis of empirical data with my own experience and translating the findings into relevant and practical conclusions for practitioners. It is a weakness, because such an intimacy with my object of study presents a risk of emotional investment and bias. Faced with the same frustrations as my academic interviewees, it would be inevitable for me to identify with them and possibly discriminate in favour of some findings over others of equal illuminating value. I was fully aware of this and made every effort to maintain a certain distance from the field. This was helped by two factors. First, I have never experienced many of the spatial travails told by my interviewees because I have never had an office in a business school. Second, my neophyte understanding of the organizational landscape of business schools meant that I had – at least at the beginning of the study – a naïve gaze upon my object of study. This personal position in relation to my object of study is considered in the Research Design and the discussion in the Findings section.

It is important to describe the above intellectual and personal journey at the beginning of this dissertation since it is the basis of the structure of the rest of the document. It is composed of three main sections – Theory, Research Design and Findings. Each section describes the journey as it pertains to the matter with which it deals. There may be a certain sense of repetition – and I apologize in advance – however, this was the only way to structure the dissertation without losing the precious details about the journey. Omitting these details would feel to me to be an exercise in misrepresentation. To

recompose this study as an improbable linear sequence between theory, design, fieldwork and findings would only diminish the plausibility of the findings and obfuscate the weaknesses of this study. Furthermore, the details of the journey only enhance the theoretical insights from the findings rather than diminish them. It is also hoped that it makes for more pleasant reading.

## 2 Theory

Investigations on the effect of information and communications technology on physical space have already been undertaken in the area of human geography. There is a sizeable body of literature on mobility underpinned by information and communication technology. However little work has been done on the relationship between organizational space and ICT – especially connected devices. Organisation studies and management literature have extensively examined how physical spaces of organizations are related to organizing, but ICT is remarkably absent.

In this section, we will first review the literature on organizational space. Starting from the Ancient Greeks on to the Enlightenment thinkers, and leading up to contemporary organizational space theory, we trace back the philosophical roots of organizational space theory. We will then see how organizational space is considered in the IS literature, before moving on to a review of the literature on Gibsonian affordance in the literature dealing with technology. The final chapter will trace the the theoretical journey of this study by developing each iteration of the theoretical framework used for data collection and analysis.

### 2.1 Organizational Space<sup>1</sup>

Organizational space is attracting increasing attention from researchers across a multitude of disciplines. It has traditionally been taken for granted in organizational studies and management literatures.

Physical space is such a given in much of our day-to-day activities, it seems to disappear into the background. It usually becomes a matter of conscious reflection when for example one visits foreign countries, is asked to design a building or is faced with significant disruption to their habitual movements (a transport strike). Physical space – and especially in urban contexts – is what shapes our movements (Certeau, Giard, &

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<sup>1</sup> This chapter is based on an early draft of the published book chapter, written with Stewart Clegg, *Théorie des organisations: l'espace perdu?* in *Théories des organisations: nouveaux tournants* De Vaujany, F.-X., Hussenot, A., & Chanlat, J.-F. (Eds.). 2016. ***Théories des organisations: nouveaux tournants***. Paris: Economica.

Mayol, 1990; Lefebvre, 1974). The roads, sidewalks, pathways, hallways, stairwells and subway lines of the city channel us from one point to another. These points within the urban landscape are also shaping our movements in both space and time. We move from the home to the place of work in the morning and return in the evening. In between, other points act as passages or waypoints – a stop at the drycleaners or the station where one changes from the bus to the tram. These cyclical movements are 'pendulumlike' (Tuan, 1977: 181) and define the daily routine for most contemporary active professionals. They take this routine for granted and their bodies internalize the movements (Bourdieu, 1980). The urban space may constrain motion by design (Lefebvre, 1974), but a city walker can call upon a set of movements – or 'grammar' – to modify the routine and possibly transgress institutionalized boundaries such as walking through private property as a shortcut (Certeau et al., 1990). A similar cyclical movement occurs during school holidays, when families head to the seaside or camping grounds. Bodies become pendulums, and their ebb and flow define the life of the modern city.

In Kristian Kreiner's words, "Space matters to organizations; and therefore, space should matter in studies of organizations" (2010). Space makes organizing possible. Although such a statement may seem self-evident, it is striking to ascertain that space has broadly been taken for granted in organizational studies up until relatively recently (Clegg & Kornberger, 2006). In fact, Kreiner goes on to suggest that it is this very taken-for-granted nature of organizational space that makes it of particular concern for organizational studies. It seems obvious why newly hired office staff need not be told how to sit at a desk or engage in discrete conversation in an open space. Such spatial practices are both socially and materially embedded in our day-to-day movements without us realizing it. How these spatial practices develop and become known-without-knowing is a mystery just beginning to be investigated by researchers.

Space considered in isolation is an empty abstraction; likewise energy and time. Although in one sense this 'substance' is hard to conceive of, most of all at the cosmic level, it is also true to say that evidence of its existence stares us in the face: our senses and our thoughts apprehend nothing else. (Lefebvre, 1991: 12)

The taken-for-granted nature of space in our day-to-day movements is cogently captured by the words of Henri Lefebvre above, extracted from his very influential book *La production de l'espace* (1974). It can be especially surprising to discover how little research on space has been undertaken more broadly in the social sciences, other than in geography and history, until relatively recently (Clegg & Kornberger, 2006; Marrewijk & Yanow, 2010; Warf, 2009). Organizational studies are no exception and as this section – and especially this present chapter – attest, we are in the midst of a ‘spatial turn’ in this discipline, something happening within the context of a broader ‘material turn’. This is not to say that space has been completely ignored in the past. It has been present – albeit often in an austere, static and lifeless form. This is in opposition to time, a concept that has been seen as rich, animated and full of life (Foucault, 1980).

Jammer (2013) believes that modern philosophy has long been under the influence of Leibniz’s assertion that the flow of time is the manifestation of causation and that space is simply an instantiation of such manifestations. Perhaps this state of affairs is best illustrated in the way geography faculties have traditionally played second fiddle to history departments in universities around the developed world. It is certainly not as Marx had predicted, the ‘annihilation’ of space by time, but rather the domination of time over space. John Urry (2004) deplores the traditional ‘a-spatial’ approach to sociology of the 20<sup>th</sup> century, which has kept geography partitioned from other disciplines such as history, despite the efforts of scholars such as Braudel (1995). We will see, however, that the tide has been turning and space has been finding its rightful historical place in the social sciences, including organizational studies (Urry, 2004). We see this as a critical juncture in organizational studies and agree with Dale & Burrell’s view that “organizations and organizing are as embedded within the material world as they are within the social” (Dale & Burrell, 2007: 34).

The objective of this chapter is to present you with an overview of the current state of theorizing organizational spaces. The most recent theories, concepts and ideas are borne out of the intersection of a few important streams of Western philosophy. We will therefore trace the philosophical origins of organizational space theory and situate each phase of development in time and their corresponding paradigm. This will set the stage for a review of what we deem to be the most significant contributions to date to organizational space theory. We will then identify the key stakes and questions

regarding theories of space in organizations. More specifically, we will look at which orientations are best suited for studying spatial practices in organizations and why.

### **2.1.1 Philosophical roots of organizational space theory**

Western philosophy has been concerned with space since Antiquity in both implicit and explicit modes. Ancient Greeks didn't have a stable and well-defined concept of 'space' but developed other related notions such as *topos* (likened to 'place') and *kenon* (likened to 'void') (Algra, 1995). *Topos* is a defined place which has been carved out of the *kenon*. It is only, however, since the Age of Enlightenment that arguments about the spatial nature of the social world have been put forward explicitly. The four principal philosophical roots for organizational space theory all develop out of the Enlightenment: Cartesianism, Neo-Kantianism, Marxism and Husserlian phenomenology. Although each has produced different streams of thinking on organizational space, we will see that current organizational space theory – along with other disciplines – has so far been mainly inspired by both Cartesian and Marxist-inspired thought. This is the result of a historically contingent process and not necessarily due to any weaknesses in other approaches. In fact, it is hoped that being aware of the epistemological alternatives to studying space in organizations will encourage a healthy form of theoretical rivalry and eventually lead to a higher diversity in organizational theory. Although we will now present each of these principal philosophical roots along with the relationships between them, we will not develop in detail the historical process that led to the development of these ideas. This would be a task for another work.

#### **2.1.1.1 Roots in Ancient Greece, Enlightenment and Descartes**

Although we have labelled the first stream as Cartesian, thus suggesting roots in the Age of Enlightenment, one can, if one so desires, trace its origins back to Ancient Greece. Atomist and Stoic schools of thinking underpin Cartesian ideas about space – especially the notion of *kenon* (or void) (Malpas, 2006). Perhaps it is ironic that it is thanks to a rival to Descartes – Isaac Newton – that the Cartesian conception of space found a solid place in modern Western philosophy (Jammer, 2013). In this conception, physical space is essentially rectilinear, homogenous and infinite. It can be objectively measured – such as the distance between two points – and remains constant over time. Modern ideas of social space were closely aligned, stressing the rectilinear, the geometrical, the straight



line, and planned harmony. As such, social space serves as a container for society that can be manipulated to serve specific social goals such as separating one group from another, ordering and organizing land, town and cityscapes. Such approaches have remained the privileged form of spatial analysis since the Age of Enlightenment and especially in the 20<sup>th</sup> century, thanks in large part to the dominance of logical positivism (Jammer, 2013). Casey, commenting on the neoclassical, post-Enlightenment era in Europe, says:

The rich significance bestowed on the world by qualitative sensuousness and, more largely, by life and lifelike forms is ignored in favor of the quantitatively determined forces and motions that are held to control and rule nature. The research program to study these forces and motions – a program first devised by Galileo and Descartes and Pascal, Huygens and Boyle and Newton – is pursued with unrelenting vigor in the next century. Obsession with this pursuit left no place in "the remainder of things" for the "concrete realities" that prevail in everyday experience (1997: 181-182)

**Inset 1: The skyscrapers of Montreal – welcome to the Matrix of Cartesian space**

As I sit eating my lunch on the 2nd floor of a nondescript office building in downtown Montreal, I come to realize something astonishing about the urban space on display through the panoramic windows. It is dominated by one shape – rectangles. Everything from the windows to the parking space markings on the asphalt is a rectangle. It makes me think of Michel de Certeau's observation of Manhattan from the 110th floor of the now gone World Trade Centre (1990) and I imagine myself zooming out and above the city of Montreal like a Google map. The city blocks, the buildings (in all three dimensions) and the vehicles moving on the streets below are rectangular in shape. Back down to earth – or the 2nd floor – the facades of the glass and steel skyscrapers look like the graph paper upon which I used to draw in engineering school. The city landscape is a three-dimensional grid. Each unit corresponding to a block, tower, floor, office, shop, window, parking spot, etc. Just like a 3D matrix, the space of downtown Montreal has been parceled into interchangeable units like the pieces of a Rubik's cube. Even the basic unit of measurement for the purposes of exchanging physical space is the square foot or even the cubic foot (for storage and ventilation). Of course, I know the story of how the Jeffersonian logic of parceling the American landscape into squares in the 18th century has extended into cities and eventually management practices (Clegg & Kornberger 2006). But for once, I see with my own eyes how space and labor have been subdivided into homogenous, measureable, and interchangeable entities. This is what Henri Lefebvre meant when he wrote about the simultaneous fragmentation, homogenization and hierarchizing of modern space. It is the 3D rectilinear gridiron of capitalism. Welcome to the Cartesian matrix.

Despite the dominance of the Cartesian view of a rectilinear neutral container, many thinkers have continued to grapple with metaphysical questions regarding space. Does it really exist? Can it be sensed? Is it truly infinite? What is it made of? Is it just a product of the mind? These are questions that can apply to time as well and both have often been

thought about jointly, often as a dualistic whole (such as in physics with the space-time continuum). It only takes a moment to ponder these questions to realize the difficulty in conceptualizing space – especially given how essential it is to our experience as embodied beings: we ‘move’ through space, we perceive things that are both near and far, we cannot be in two ‘places’ at once, etc. Although philosophers have developed answers to these and other questions about space (and time), the neutral view of space as a taken-for-granted affordance has been the default perspective for the past few centuries of most social science research. As mentioned earlier, this is especially true given the context of intellectual debates in the modern era where time has dominated space. However, many of the emergent ideas from the Age of Enlightenment have produced schools of thought on space that are now helping develop a less austere form of spatial analysis in the social sciences.

Immanuel Kant’s views on space expressed in *Critique of Pure Reason* in 1781 are in part a reaction to Cartesian conceptions via Newton (1881). Kant is particularly preoccupied with the ontological status of space and, more specifically, whether it is dependent or not on the mind. Contrary to the Cartesian view of an autonomous ‘absolute’ space, Kant argues that space is an *a priori* concept – one that is based on pure intuition as opposed to empirically derived. He contends that the ‘experience’ of space (through the body) is dependent on a predetermined representation of it; such a representation precedes and anchors such ‘experience’. For Kant, space is ascribed to one’s bodily experience intuitively, as a way of making sense of this experience (Casey, 1997). This way of conceptualizing space stems from Kant’s doctrine of transcendental idealism which posits that empirical reality can only be accessed by our objective – and intuitive – experience of it. By making space dependent on the mind, Kant not only fueled contemporary debates about space but also generated new ones, which in turn spawned theories. We will now look at three streams influenced by Kant we believe have shaped the theorization of space in the social sciences. One of them in particular has been dominant in the more recent developments of organizational space theory – Marxism and critical approaches (Warf, 2009).

### 2.1.1.2 *Neo-Kantianism and Simmel*

According to Urry (2004), Georg Simmel is the most important classical contributor to theories on space in the social sciences. Although Simmel took a heterodox and interdisciplinary approach to sociology for his time, he has been widely recognized as neo-Kantian. His doctoral thesis was on Kant's philosophy of matter. Simmel developed the concept of sociation (a type of interaction between social actors dependent on spatial positioning), to study how space sets the conditions for social interaction and in turn how social interactions shape space. He attributes five fundamental qualities of space as topics for analysis: exclusivity or uniqueness (how a nation-state has exclusivity over a territory for example); the subdivision of space into framed entities (the way nation-states and their territories are bounded for example); the localization and fixity of social interactions in space (the town market square for example); sensory proximity or distance (how, for example, the smell of a rubbish dump would push residents away); the mobility of individuals in space (Simmel, 2009). Simmel further develops his conceptualization of space in *Metropolis and Mental Life* (1997) by examining the effect of the modern urban physical space on social interaction.

These views on the ever-expanding urban environments of the *fin de siècle* period, however, were not convincing for Simmel and Weber's contemporaries. For example, Simmel was very much criticized by Durkheim for not grounding his theories in empirical observation and his work was largely ignored in the development of urban sociology (Urry, 2004). More recently, though, Simmel's ideas on space – especially his spatial property of mobility – have underpinned the very influential 'Mobilities' paradigm developed by Sheller and Urry (2006). Like Simmel's original concepts of sociation, the 'Mobilities' paradigm was created to help make sense of the sprawling urban spaces of our time.

### 2.1.1.3 *Husserlian Phenomenology*

The German philosopher Edmund Husserl is considered to be the father of phenomenology and was indirectly influenced by Kant in his ideas. It was mainly through Paul Natorp that Kant's transcendental idealism became an integral part of Husserl's approach to metaphysical problems including space (Makkreel & Luft, 2009). In contrast to Kant, Husserl's focus was more epistemological than ontological regarding

space. In *Ideas* (2012), Husserl made the case for a method he called transcendental phenomenology. According to this method, objects we encounter everyday naturally take shape in our consciousness. Our intuition, or a form of inner perception, which is based on essential structures, guides the way these shapes take form in our consciousness. He believes our experience of spatio-temporality, as human beings, is such that embodiment and causation are based on essential *a priori* structures of an intentional consciousness shared by all (Husserl, 1997). Furthermore, he claims that for intersubjective experience to occur, one must assume that the others with whom one interacts shape their spatial perspectives in the same manner. Husserl's transcendental phenomenology is closer to realism than Kant's transcendental idealism.

Martin Heidegger had been a student of Husserl's and initially espoused his mentor's beliefs. However, Heidegger's developed a phenomenology that eventually departed from Husserl's somewhat neo-Cartesian separation of subject and object (Crowell, 2001). This is clearly evident in *Being and Time* (Heidegger, 2007) in which he developed the concept of *Dasein*. By moving beyond any sort of subject-object duality, Heidegger's *Dasein* describes an ontology based on 'being-in-the-world' where one is immersed in contextual meaning through one's activities in which neither subjective representations nor objective realities come into play: more mundane matters suffice. He employs the example of hammering where when one picks up a hammer to drive a nail into a wood plank: one is not standing back and conceptualizing the hammer as a tool but engaging with it to perform the act of hammering where the hammer itself shows itself to be 'ready-to-hand' (Heidegger, 2007).

Malpas (2006) suggests that by having the 'in' within 'being-in-the-world', Heidegger had integrated space as an essential aspect of his concept of *Dasein* from the beginning. In some of his other works, Heidegger illustrates the spatial implications of *Dasein* by developing the notion of 'dwelling' where one does not simply locate one's self inside a locale but rather 'dwells' there immersed in meaning and a sense of belonging (El-Bizri, 2011). With 'dwelling', Heidegger mobilizes a very different set of ideas about space when compared to the other concepts discussed up to this point. Malpas (2006) links 'dwelling' with the notions of caring and 'homeliness'. Heidegger believes that places such as homes and parks – where one can 'dwell' – are generative of space. Such places are not *in* space but rather space is *part* of place. This corresponds to the lived

experience of individuals where space is generated from the places of experience – such as homes and parks (Casey, 1997). With Heidegger, space comes to life with meaning and loses its Cartesian austerity.

Both Husserl and Heidegger's novel and lively phenomenological approach to space inspired many thinkers in the early part of the 20<sup>th</sup> century, notably in France and within the emerging existentialist movement. Although not entirely aligned with either the Husserlian or Heideggerian approaches, Jean-Paul Sartre developed his own version of phenomenology in *Being and Nothingness* (2012), in which he founded his philosophy of existentialism. Sartre was soon joined by Maurice Merleau-Ponty who was particularly interested in the problem of space within the phenomenological paradigm. It was in *Phénoménologie de la perception* (1976) where he developed in detail the concept of spatial corporeity. Merleau-Ponty intended to develop a philosophy of experience based on the essence of naïve perception – the sort a child would have before acquiring methods of abstraction. Merleau-Ponty's philosophy is centered on the body and considers bodily movement as generative of space (Casey, 1997). Michel de Certeau, another Frenchman, would later develop Merleau-Ponty's spatial corporeity into a modern theory of spatial practices centered on the body (1990). De Certeau likens the act of walking to speech and develops a categorical framework to analyze spatial practices that is based on the narrative power of the pedestrian in an urban environment.

In 'Walking in the City', in *The Practice of Everyday Life* (Certeau & Rendall, 1984), Michel de Certeau contrasted the 'panoramic' view from above with the 'practices' of city life as it is lived by its inhabitants. While the city can be mapped by a 'totalizing eye' the legibility it creates as a mapping of social space is a fiction, 'a "theoretical" (that is, visual) simulacrum' which obscures the true nature of the city space as it is lived (1984: 93). Against such rationalizations de Certeau offers the idea of 'practices' of life, conducted every day, which undermine and oppose a totalizing view of the city.

The ordinary practitioners of the city enjoy an elementary form of experience of the city; they are walkers, following the folds of the urban 'text' of the city. These folds are not the 'geometrical' or 'geographical' space of visual, panoptic, or theoretical constructions (Certeau & Rendall, 1984: 93) found in maps. Mapping the city creates an organized

illusion of the totality of the city, a totality incomprehensible in the everyday lives of its citizens. The walker produces the city every day, journeying through its labyrinths. The city is a text, a system of signs. Reading these signs reveal the hidden or 'subterranean', that which, in de Certeau's terms, is 'below the threshold' of visibility. Walking in the city helps make the invisible legible.

The city is not just capital, however: it is a space peopled, populated, embodied. The key notion of spatial corporeity for both Merleau-Ponty and de Certeau is strongly incorporated – implicitly and explicitly – in the ideas about space presented by other more recent French thinkers not identified as phenomenologists, such as Pierre Bourdieu (1980), Michel Foucault (Harvey, 1989) and Henri Lefebvre (1974). Moreover, Bourdieu and Lefebvre share de Certeau's linguistic metaphor for spatial practices – a notion first developed by Simmel. Through his concept of *hexis corporelle*, Bourdieu centers his theory of practice on the human body and implies that habitus determines the spatial practices of a given community. These could be as trivial as the manner in which one sits, walks or wears clothing. Similarly, Foucault's analysis is focused on the body that he considers as the elementary space of the social world. As Harvey remarks, he "treats the space of the body as the irreducible element in our social scheme of things, for it is upon that space that the forces of repression, socialisation, disciplining, and punishing are inflicted" (Harvey, 1989: 213). Lefebvre in turn develops the notion of the *corps spatial* or 'spatial body' that is the basic unit of the production of space. Not unlike Foucault, Lefebvre not only sees the body as the starting point for the production of space, but also the element upon which space itself imposes and constrains gestures and movement. The fundamental notion of spatial practices as everyday practices centered on the body is the principal contribution of this phenomenological stream to organizational space theory. It is mainly through the work of sociologists anchored in other philosophical traditions who have adopted this notion that this contribution is made.

#### **2.1.1.4 Marxism and Critical Approaches**

Marxism and related critical approaches underpin many of the more recent organizational space theories. These schools of thought have a complex history and deal with a wide array of social issues that are embedded in the events of their time of

inception. We will not review the philosophy of these schools of thought, but show how spatial considerations have been implicitly incorporated. We will then focus on two key contributors: Henri Lefebvre and Michel Foucault.

Neither Marx nor Engels had space as a central theme in their works. Both were especially concerned about the social effects of rapid industrial capitalistic growth on the fabric of local communities (Urry, 2004). Marx makes this more explicit by later criticizing the capitalist compulsion of ‘annihilating’ space by time (2012). However, these considerations never ‘materialized’ in early Marxist research. While Engels (1845) paid particular attention to the spaces in which the urban working class lived in 1844 he does so in a largely descriptive manner. Furthermore, in yet another ironic twist, Marx has been widely accused of having a temporal bias in his critique of capitalism (Soja, 1989; Warf, 2009). This analysis is perhaps not very surprising given Marx was inspired by Hegel’s deeply historicist philosophy (Hook, 1962). Hegel developed views on space in the context of his argument with Kantian thought but most critics have not considered these views coherent or sound (Jenkins, 2010). This deficiency has prompted some Marxist thinkers in the latter part of the 20<sup>th</sup> century to remedy the situation and treat space as a central theme in their work. One in particular has had a significant impact on organizational space theory.

Henri Lefebvre is considered to be the key figure in Western Marxist spatial theory and a forceful proponent for spatial analysis in the critical tradition (Soja, 1989). Spatial analysis figured prominently early in his work, but it was with his magnum opus titled *La production de l’espace* (1974) that he expounded in detail his theory. As suggested earlier, Lefebvre combines his critique of capitalism’s propensity for spatial command and control with an emancipatory phenomenology. His theory is rich, versatile and intended to be universal. As such, it is difficult to reduce into a simplified framework that can be represented in schematic form. We can however present some key concepts that are relevant for organizational space theory. In the opening quote to this chapter, Lefebvre refers to the everyday relationship we have to space: “our senses and our thoughts apprehend nothing else”. This statement reveals a Heideggerian starting point in his thinking of space – something he makes explicit in his monograph. Adopting a phenomenological stance, Lefebvre explains in detail how the production of space is centered on the body. He provides many illustrations of this by referring to banal

activities such as opening and closing drawers or walking. Through an elaborate Marxist critique of capitalism, he develops the core of his theory based on a series of related conceptual triads (to avoid oppositions) and dyads relating to space. On pages 48 and 49 (1974) he presents the main set of concepts: spatial practice (the day-to-day practices simultaneously shaped by and shaping space), representations of space (space conceptualized such as by urban planners and architects) and representational spaces (space as it is experienced). Overlaying this triad are perceived, conceptualized and lived spaces. These three concepts form a unified and universal framework bringing together physical, mental and social spaces (Elden, 2004). These concepts are summarized in Table 1. Other sets of related concepts are absolute, real, abstract and social spaces; *intuitus*, *habitus* and *intellectus*; and, the periphery-center dialectic. All of Lefebvre's concepts provide a wealth of analytical categories for the social sciences in studying space. It is worth noting that apart from organizational studies, Lefebvre's theory has found a solid uptake in geography with the work of Soja, Gregory and Harvey (Dale & Burrell, 2007).

Social space needs to be defined and related to physical space. There are few explicit definitions of social space, however Lefebvre devotes an entire chapter of *La production de l'espace* (1974) to social space. In this chapter, Lefebvre affirms that "(Social) space is not a thing among other things, nor a product among other products; rather, it subsumes things produced, and encompasses their interrelationships in their coexistence and simultaneity – their (relative) order and/or (relative) disorder. It is the outcome of a sequence and set of operations, and thus cannot be reduced to the rank of a simple object" (1991: 73). Using the city of Venice as an example, he illustrates this conception of social space as the set of relationships – both social and physical – between objects and humans that is the product of an ongoing process also defined by this very same set of relationships. Hence, per Lefebvre's conception, social space comprises of physical space, but is not concomitant to it. Furthermore, he emphasizes that a given social space – such as the city of Venice – comprises of several levels which are intertwined and imbricated with one another. He calls on one to imagine the city of Venice and the many ways in which the social space of the city is produced – by the merchants, the tourists, the waterways, the monuments, the bridges, etc. – and how each of these interacts with the others to produce this social space. This resulting social space then shapes the way



social space evolves based on both materiality (the physical environment) and the social (codes and institutions). Lefebvre's definition of social space is echoed by Pierre Bourdieu in his Vilhelm Aubert Memorial Lecture in 1995 in Oslo (1996). For Bourdieu, social space is the virtual landscape of relations between human agents structured in a complex hierarchy that defines every agent's position in relation to other agents. This virtual landscape is then materialized in physical space and provides it with a certain inertia such that social space is anchored into physical space, requiring much effort to change the former. What Bourdieu doesn't discuss, however, is how the existing physical space – apart from anchoring social structures – shapes social space by either constraining or channeling action in a certain fashion. For Lefebvre, this is an important point, since he believes that social space was originally shaped by the human body's physical properties – size, composition and symmetry (right and left). From this basis, the production of space is initiated and sustained. The way humans experience their physical environment – what is possible to do or not – is entirely dependent on the human body's specific characteristics and its resulting perception of the world. Once humans fashion their physical environment in accordance with bodily constraints, this resulting physical environment in turn shapes how humans relate to one-another, and hence shapes social space.

Spatial practice / Perceived space	<ul style="list-style-type: none"> <li>• Physical space</li> <li>• Space made conscious</li> </ul>
Representations of space / Conceptualized space	<ul style="list-style-type: none"> <li>• Mental/Abstract Cartesian space</li> <li>• Conscious and instrumental projection on material world</li> <li>• Relations of power generally embedded and implicit</li> </ul>
Representational space / Lived space	<ul style="list-style-type: none"> <li>• Social space</li> <li>• Subconscious engaging with space</li> <li>• Heideggerian experience of 'dwelling'</li> <li>• Mode of possibilities for either domination or emancipation</li> <li>• Relations of power often explicit or exposed through symbols or images</li> </ul>

Table 1 – Lefebvre's Spatial Triad based on Elden (2004) (Author)

Although not identified as a Marxist, Michel Foucault is widely recognized as one of the most influential critical theorists of the 20<sup>th</sup> century. Like Lefebvre, he advocated more spatial analysis in the study of social phenomena. However, unlike Lefebvre, Foucault did not aim to produce unitary theoretical constructs with universal applicability – each of his theories was very specific to the context of his analysis (Gutting, 2005). Furthermore, although space was incorporated in his analysis of power, it came into focus only on the margins of his work. This is the case with the notion of heterotopia, a spatial concept Foucault adopted to theorize space in the social sciences (Dehaene & Cauter, 2008). Heterotopia denotes spaces existing within society that allow one a privileged perspective from which to view the normalcy of the social order. Some examples would be the spaces afforded by brothels, cemeteries and theatres (Beyes & Michels, 2011). Foucault focuses much of his work on relations of power within heterotopic spaces such as prisons (Casey, 1997). Organizational space scholars have drawn inspiration mainly for this body of Foucault’s work, as we will see a bit later.

According to Soja, both Lefebvre and Foucault provided the ‘reconfigurative arguments’ for the spatial turn in the social sciences (Warf, 2009: 18). Both, but Lefebvre especially, have provided the epistemological foundations incorporating both objective and subjective accounts of space. In this sense, they have managed to bring together the conceptual riches of the various schools of thought on space, going back to Kant, with Cartesianism and Phenomenology at either end of the spectrum. The fact that they have done so from within a critical tradition adds to the conceptual wealth, as we shall see in the next section where we look at how the spatial turn in organizational studies has recently built upon the foundations provided by Lefebvre and Foucault.

As a summary, the philosophical roots of organizational space theory, as presented in this chapter, are sketched in Figure 1. Kant’s seminal thoughts initiated a cascade of new ways of conceptualizing space that would eventually compete with Cartesianism. We can see how each of these branches evolved in relation to each other over time and the interactions between them. Visually remarkable is how notions of spatial corporeity from the phenomenological branch have influenced the development of theories in the critical tradition, notably with Lefebvre and Foucault.

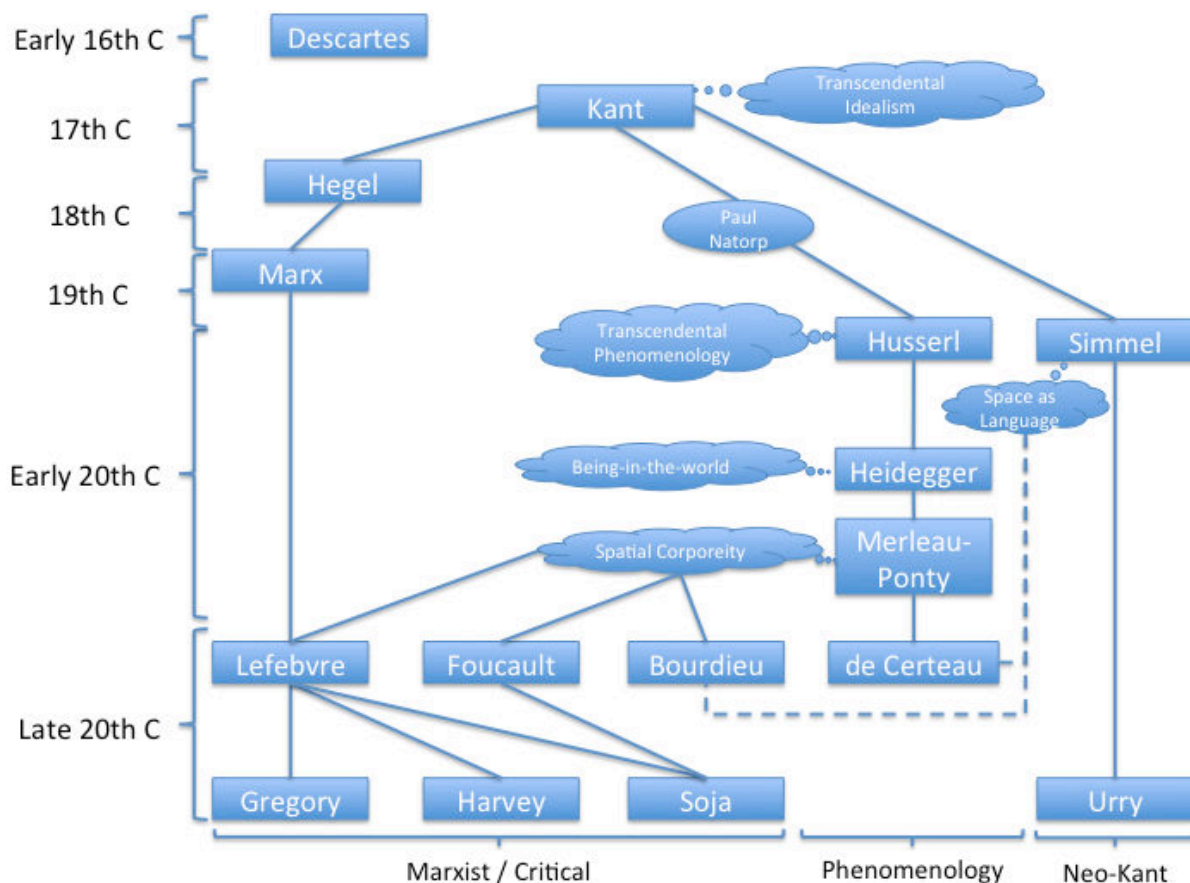


Figure 1 – Genealogy of space theory (Author)

### 2.1.2 Theorizing Organizational Spaces

In tracing back the philosophical roots of organizational space theory, the stage has been set for a review of the most significant theoretical contributions to this area to date. In the process, we will identify the key stakes and questions regarding organizational space theory.

#### 2.1.2.1 Some key theoretical contributions

Before looking at some theoretical contributions key to the study of organizational spaces, we can take stock of the research that has been conducted to date, referring to an exercise already performed by Scott Taylor and André Spicer, in their paper “Time for space: A narrative review of research on organizational spaces” (2007). Their framework, based on the core categories of Lefebvre’s spatial triad, is an appropriate way to map the landscape of the organizational space theory literature. Kristian Kreiner applies their framework to classify the body of work contained in one of the references on organizational space – *Organizational Spaces* (2010). The Taylor & Spicer framework

categorizes the literature in terms of how space is conceptualized. These categories are space as distance, space as power relations and space as experience. If we are to compare these categories to those of Lefebvre's triad, they can be approximately aligned with the three categories of conceived space, lived space and perceived space in the equivalent sequence. However, this correspondence must be assumed because Taylor and Spicer do not make it explicit. This ambiguity and uncertainty demonstrates the limitations in terms of both the way Lefebvre's categories can be interpreted and also how such a set of categories can be confusing with regards to the emergent epistemological schools of thought on space presented in the previous section. Therefore, without significantly affecting the substantive categories of the Taylor and Spicer review, we propose relabeling the categories as Cartesian, Marxian and Phenomenological.

#### 2.1.2.1.1 Cartesian

Cartesian theories of space – or space as distance – make up the bulk of the contribution to this area of study. It is also a category with some of the oldest works on organizational space. Most are concerned with the layout of workplaces and how this affects productivity, innovation and other aspects of organization. The debate on the effectiveness of open-plan office spaces is one example of the focus of these types of study. The advantage of propinquity (physical proximity attributed to open-plan layouts) versus privacy (physical partitioning with walls) is the conceptual axis upon which this particular debate is located. The key epistemological assumption is that social and physical proximity are equivalent (Fayard & Weeks, 2011).

A relatively newer topic within this category of studies deals with the virtualization of organizational spaces and the effect of such practices as telecommuting. However, as Taylor and Spicer note, these practices are not popular and relatively rare despite the hype produced at the time when domestic broadband Internet connections started to become widely available. Some recent research points to a slow process of advanced information and communications technology effecting changes on the spatial organization of work and suggests the social consequences have yet to be fully explored (Felstead, 2012). Other Cartesian studies are situated at the inter-organizational level where the focus is usually on the spatial dynamics of a specific industry. Practices such

as clustering, where organizations with trade ties (suppliers and clients for example) locate themselves within physical proximity of each other, are the objects of study. Very often, these studies find that the development of social networks and human ecologies are critical aspects of spatial dynamics at this level. It is likely Cartesian studies are as common as they are because of the ease with which physical space is observable and mappable. The cumulative effect of their knowledge is the strength of their contribution to organizational space theory. However the material determinism of this approach makes it difficult to take into account the spatial dynamics of power relations and the role of the experience of occupants (Taylor & Spicer, 2007).

#### 2.1.2.1.2 Marxian

The approaches belonging to this group are focused on power relations embedded in material organizational space. Hence, they rely on a narrower set of analytical categories than those provided by either Lefebvre or Foucault as presented in the previous section. These Marxist analytical categories are generally concerned with spatial modes of worker control at various levels of presence – not only within the physical boundaries of the workplace. For instance, some studies look at how the building of company towns in the past has been motivated by the desire to control both the private and public spaces of workers (Dale & Burrell, 2007). Silicon Valley can be considered a contemporary – and larger scale – version of the company town (English-Lueck, 2000).

Other studies are interested in how organizations incorporate the Benthamite concept of the panopticon in the design of their workspaces and eventually how forms of resistance emerge. The introduction of information and communication technologies (ICT) into work practices has allowed for new forms of spatial control (Leclercq-Vandelannoitte, Isaac, & Kalika, 2014). It is especially through the blurring of boundaries between the home and the workplace that these modes of control have emerged. For example, enterprise applications such as Microsoft Lync for instant messaging combined with mobile technologies and high-speed Internet are increasingly used both at the office and the home (Tang et al., 2013). The specific presence information feature of this application (an indicator to the other enterprise users about your online status) can allow managers to be informed about when employees are connected to their work networks and keep a record of this over long periods of time. When connected,

employees can be considered available for work regardless of whether they are in the office or at home. This is a new form of control afforded to managers that did not exist when the boundary between work and home was spatially and temporally less fluid.

**Inset 2: Fayard & Week's 'Who Moved My Cube?' (2011)**

Photocopiers/printers are perhaps one of the most frustrating and at times infuriating work tools to deal with. Who hasn't ever had to deal with a paper jam, low toner or copies coming out sideways because the original wasn't orientated the right way? It seems, according to Anne-Laure Fayard and John Weeks, this very annoying character of photocopiers/printers is responsible for much informal and spontaneous social interaction between office workers. When a colleague is standing baffled in front of the machine, there is a natural tendency for one to offer help and perhaps eventually tackle the problem in tandem. Connections are therefore established in an informal manner at a location and around a tool in the work environment never intended for social interaction. Although these interactions are unintended, photocopiers/printers and their localization in office environments are a good illustration of what Fayard and Weeks refer to as spatial affordances. Centrally located – albeit usually in a retreated space – and considered a legitimate work destination, photocopiers/printers ideally combine the three types of affordances the authors propose: proximity, privacy and permission. Not only does this encourage informal conversation between colleagues who would otherwise not have the chance to interact over the course of the day, but also provides a space for private exchanges away from the eyes and ears of others. Personal experience concurs with the conclusions of these researchers, although there are some even more interesting twists, especially with the printer function. On more than one occasion on a trip to the photocopier/printer to fetch a job, we would come across interesting documents that we would otherwise never see. Colleagues would often send their jobs to the printer and pick them up a bit later, perhaps on their way to the restroom or the coffee machine. In the meantime, these documents would lie there on the output tray of the machine within a pile of other jobs. In the process of extracting our job, we would – in a perfectly legitimate way – see what colleagues are printing. A quick scan of these documents would provide us with information about what is happening in other teams, about imminent restructuring, or perhaps even office romances! We would even see who is printing out documents we circulate and get an idea of who is paying attention to our work. All of this afforded by the spatially centralized nature of the printing facility along with the practice of combining a trip to the printer with a restroom break. The spatial nature of photocopying or printing in an office space not only produces informal social interaction, but also unintended dissemination of information that can have equally positive or negative consequences for an organization. This very contemporary experience of such a mundane task as photocopying or printing in an office is a very good example of how material and social factors shape space.

Interestingly, most managers seem still to prefer more traditional methods of control on the workplace site rather than using new modes afforded to them with ICT. Perhaps this is because physical presence remains the most basic form of control and also that ICT not only allows new modes of control but also new forms of resistance. Taylor and Spicer also mention studies that see the city as the materialization of power relations (2007).

### 2.1.2.1.3 Phenomenological

In Taylor and Spicer's review, this group of studies draws mainly on organizational symbolism and organizational aesthetics to examine the meaning embedded in organizational spaces through artefacts such as furniture, clothing and decoration but also office layout and building design (2007). Buildings themselves embody scripts, narratives and stories that can be read, thus not only uncovering intentional social cues but also revealing scars of past and current battles (Dandridge, Mitroff, & Joyce, 1980). For example, the bullet holes on the outside walls of the *École des Mines* and *Préfecture de Police* buildings in Paris are quite literally scars telling stories of past struggles. These have possibly been left unrepaired intentionally to tell passers-by a story engraved in stone. Taylor and Spicer cite several studies from this group dealing with the symbolic and aesthetic aspects of organizational space (Berg & Kreiner, 1990; Cairns, 2002; Galison & Thompson, 1999; Goodsell, 1988; Hatch, 1990; Knowles & Leslie, 2001; Yanow, 1995; Yanow, 1998).

Other studies have been focused on how occupants can rewrite scripts to disrupt embedded modes of spatial dynamics, usually present by design to evoke particular feelings and encourage certain behavior (Cairns, McInnes, & Roberts, 2003; Hjorth, 2005). Cultural studies are also mobilized in explaining how experiences of organizational space can be influenced by poetic and literary imagery specific to the cultural context of the organization. For this approach, Taylor and Spicer make reference to a seminal work by Gaston Bachelard *La poétique de l'espace* (1957). The perspectives Taylor and Spicer attribute to this group – which they label 'space as experience' – seem to have a certain hermeneutic bias. This is an enduring characteristic of conceptualizing space in the social sciences that limits analysis to the 'readable-visible' (Lefebvre, 1974: 171).

The results this review are summarized in Table 2 below.

<b>Epistemological Approach</b>	<b>Key analytical concepts</b>	<b>Key contributions</b>
<b>Cartesian</b>	<ul style="list-style-type: none"> <li>• Physical layout of workspaces</li> <li>• Propinquity vs. privacy</li> <li>• Telecommuting</li> <li>• Clustering</li> </ul>	(Bresnahan & Gambardella, 2004; Fayard & Weeks, 2011; Fayard & Weeks, 2007; Felstead, 2012; Hatch, 1990)
<b>Marxian</b>	<ul style="list-style-type: none"> <li>• Power relations</li> <li>• Surveillance</li> <li>• Worker control / resistance</li> </ul>	(Dale & Burrell, 2007, 2010; Panayiotou & Kafiris, 2010; Zhang & Spicer, 2013)
<b>Phenomenological</b>	<ul style="list-style-type: none"> <li>• Materially embedded meanings</li> </ul>	(Berg & Kreiner, 1990; Cairns, 2002; Galison & Thompson, 1999; Goodsell, 1988; Hatch, 1990; Knowles & Leslie, 2001; Rapoport, 1982; Yanow, 1995; Yanow, 1998)

Table 2 - Overview of Organizational Space Literature based on Taylor & Spicer (2007) (Author)

#### 2.1.2.1.4 Beyond the categories

The portrait of the state of research to date on organizational space theory presented above is a fragmented one (Taylor & Spicer, 2007). Although each approach has provided a wealth of contributions to organizational space theory, they are limited by their often mutually exclusive conceptualizations of space. This situation is deplored by Taylor and Spicer and has compelled them to develop an integrated theory of space based on Lefebvre's spatial triad. Whilst acknowledging the importance of treating the three conceptual Lefebvrian categories holistically in analyzing the production of space, the authors feel that clear-cut distinctions between these categories are necessary to facilitate the process of analysis. The three proposed categories are the practices of distance and proximity; the planning of spatialized power relations; and the imagined experiences. Although this framework can be useful in providing insights, we feel it runs the risk of reproducing the same fragmented understanding of organizational space the two authors set out to overcome.

#### 2.1.2.1.5 Promising Avenues

Whilst adapting Lefebvre's theoretical categories for classifying the extant literature on organizational spaces is useful and appropriate, we believe it serves as a poor template



for future research. As we have seen from the philosophical origins of organizational space theory, the discussion on space has been polarized by the tension between object and subject; between the real and the ideal; the mental and the material. This is a tension Lefebvre, along with others, has tried to neutralize by thinking about space as both mental and material. According to Elden (2004), Lefebvre developed the concept of lived spaces to overcome the tension between the mental or *res cogitans* (conceived space) and the material or *res extensa* (perceived space). Lived spaces or the spaces of representation should not be treated as just another analytical category to put next to the perceived and conceived spaces if we are to stay true to Lefebvre's theory. Furthermore, in reducing the concept of conceived spaces to the planning of spatialized power relations, as proposed by Taylor and Spicer, one is likely to be tempted to limit the scope of their research to looking for embedded power relations in architectural designs, or in drawings for office layouts, for instance. Power relations can be present in spatial practices as much as imagined experiences within Taylor and Spicer's framework. The resulting rigidity of the analysis would limit the potential for theoretical contributions. A much more emergent and grounded approach should be encouraged in understanding organizational spaces.

Lefebvre and Foucault have developed new ways of theorizing organizational space that benefit from the diversity of thinking on the matter – but it is only a beginning. As Kreiner reflects, the richness of the Lefebvrian model can be both a blessing and a curse (2010). It is a blessing because it federates into one paradigm various historical streams of thought on space and demonstrates the potential for learning about organizations from novel perspectives. It is a curse because it remains abstract and this combined with its multiple epistemological roots generates a tendency for it to be interpreted as a reproduction of the fragmented understanding in the extant literature – Cartesian, Marxian and Phenomenological. A deeper understanding of Lefebvre's thinking along with an acute awareness of the history of thinking on space would be helpful in dispelling this curse. One can look for inspiration in some recent and original work on organizational spaces.

Iedema, Long & Carroll (2010) 'stumbled' upon a 'spatial surprise' in their research. In studying the day-to-day operations of a clinical team in a metropolitan teaching hospital in Sydney, the authors realized that a bulge in one of the corridors played an important

role in the organization. The type of space offered by the bulge in the corridor afforded staff the ability to withdraw from the more public space of the rest of the corridor to discuss confidential patient care issues. The authors argue that it is because this space is not designated as fulfilling any specific function that it was able to take on this type of role for the clinical team. They mobilize the concept of interactive affordances of spatiality to make sense of their discovery, but also look at how power relations are enacted through this spontaneous spatial practice. Weir (2010) 'stumbles' upon – in an equally serendipitous manner – the spatial practices of the Middle Eastern *diwan*. The *diwan* is usually a square room specifically arranged to seat guests on cushions placed along each of the walls. It has the specific traditional purpose of hosting assemblies of local men of influence to mainly discuss political affairs. It is when the author was invited for an audience with a local leader in a *diwan* that its very peculiar spatial practices became apparent. What made these peculiar practices apparent was the fact that Weir was an 'outsider' to this space. What locals took for granted, Weir didn't and therefore had to learn by being keenly aware of his surroundings and movements of other guests. It was also the observation of other 'outsiders' that helped him decipher the rules of this specific space. What both of these examples show is that studying organizational space needs to be opportunistic and grounded in everyday work practices. It is only once these taken-for-granted spatial practices emerge from the environment that it can become relevant to seek an appropriate theoretical framework. In practical terms, it would be highly advisable to engage in some grounded preliminary fieldwork before committing to a specific framing of the study of an organizational space. Also, as Weir shows, disruption to the taken-for-granted spatial practices of the *diwan* (the arrival of 'outsiders') puts them into sharp focus.

Iedema, Long & Carroll, and Weir raise two methodological issues specific to studying organizational space. First is the device of 'spatial surprise'. Mundane work practices performed in unexpected spaces, such as a bulge in the hospital corridors, are gems to be discovered. However, researchers can actively seek these 'spatial surprises' in organizational spaces and always turn up unexpected practices. It is especially the mundane and taken-for-granted spatial practices that tend to produce the most fruitful 'spatial surprises' for organizational space theory. Second is the notion of reflexivity. Any researcher studying organizational space must engage with the field with a

complete awareness of his or her body as part of that field. The researcher's body serves not only as an instrument to observe and collect data on the space under study, but also as an active bodily participant in spatial practices. What a researcher's body can perform on the space is just as important as what effect the space has on the bodily movements of the researcher.

The 'reconfigurative arguments' of both Foucault and Lefebvre have provided a basis for new theoretical frameworks to study organizational spaces. Fayard and Weeks' (2007) triad of proximity, privacy and permission, and Dale and Burrell's (2007) triad of enchantment, emplacement and enactment are two very good examples of how theorizing about organizational spaces need not be limited to the triad of Lefebvre but can be inspired by it. The essential spirit of Lefebvre's theory of the production of space is to not treat the mental and the material as separate but as one and the same. Sociomateriality is an emergent area in organizational studies that abides by this spirit. The sociomaterial approach conciliates the object-subject and ideal-real dualisms and develops concepts with mutually constitutive elements. Perhaps one of the most edifying works on organizational space we have come across is John Harwood's *The Interface: IBM and the Transformation of Corporate Design, 1945-1976* (2011). It is the story of a project entirely reshaping – both socially and materially – the IBM corporation. Man, machine and building are considered as one harmonious system that can be designed as a totality. The idea is to make IBM's organizational space reflect managerial desires to simply turn the organization into a model of the modern corporation. The study is an excellent example of a sociomaterial approach to studying organizational spaces where managerial values and concrete are mutually constitutive.

The field of Geography should be looked at for theoretical stimulation. As mentioned in the previous section, Geography is one of the fields that has greatly benefitted from the rich heritage philosophers have left in their lengthy arguments and written deliberations on space. Scheller and Urry's (2006) Mobilities paradigm is in part based on Simmel's concept of mobilities – a component of his theory of sociation – and in part through engagement with contemporary urban geography. It stems from an increasing concern about the social implications of the movement of people, information and things across space and time. Some have called this trend the 'mobility turn'. The Mobilities paradigm is of particular interest for organizational space researchers. Although this

framework has mostly been appropriated by human geographers (Cresswell & Merriman, 2011), we also see some emerging interest in the organizational studies literature (Costas, 2013; Vaujany & Mitev, 2013). The concept of the 'space of flows' developed by Manuel Castells (2010) is of particular relevance to organizational space research because of how it allows for the theorization of the role of new digital technologies in the shaping of space.

**Inset 3: Dale & Burrell's riparian metaphor for the production of space (2007)**

Karen Dale and Gibson Burrell provide perhaps the most suitable metaphor to illustrate the production of organizational space by comparing it to the course of a river over time (Dale & Burrell 2007, p.213-215). The flow of a river is guided and restricted by its natural channel, yet it is this very same flow that has sculpted the channel (the riverbed and riverbanks) over time. If one likens the flow of water to daily practices of workers and the channel to their physical environment, we can see how each shapes the other in the production of space. Hydraulic events and effects over time such as the erosion of the riverbanks or the transportation of sediments over long distances change the course of the river. The nature of the channel – including such characteristics as the type of rock or soil – will determine how this change will occur. An organizational space will guide and constrain the spatial practices of workers, but like the flowing river, these spatial practices will eventually change the shape of the organizational space. How this shaping occurs will depend on the characteristics of the organizational space. Although Dale & Burrell developed this metaphor with a clear social-material dichotomy in mind – the river representing the social and the channel representing the material – it can easily be transposed to a more nuanced conception of space such as Lefebvre's theory of the production of space. In this case, the channel can be just as social as material. Flow can be guided and constrained both physically and socially. For example, the formation of a queue at a bus stop will be determined both by the physical aspects of the space (width of the sidewalk for example) and the social conventions of queuing (order of arrival for example). Some commuters may, over time, repeatedly break the conventions and stand in a disorderly manner for the bus perhaps even cutting in front of others who have been waiting longer. Should this type of behavior persist with a sufficient number of commuters, the spatial practice of queuing will be replaced with that of barging and pushing to get on the bus. Commuters will no longer feel guided and restrained by the social convention of queuing. Getting back to our riparian metaphor, the social (and spatial) practice of queuing would be both part of the river channel and the flow – one reinforcing the other. The repeated breaking of the convention of queuing would be a forceful and sustained disturbance in the flow of the river thus modifying the shape of the channel and perhaps even diverting it through a different path through erosion. How easily such erosion occurs will depend on the strength of the existing channel – in this case the social convention of queuing.

## 2.2 Information and Communication Technologies and Organizational Space

At the advent of the Internet Age, predictions about the increasing irrelevance of space for economic activity were abound. Advanced telecommunications infrastructures providing high-speed broadband Internet access to homes and businesses along with increasingly powerful data processing equipment would mean the end of the traditional office at the time (Townsend et al., 1998). But this has proven to be a myth grounded in popular technological determinism predominant in the West (Graham, 1998; Graham & Marvin, 1996). Instead, more thoughtful observation has found a more complex relationship between digital technologies and the traditional work space (Bakke & Julsrud, 2008; Costas, 2013; Elliott & Urry, 2010; Felstead, 2012). Developments in digital technologies over the past 30 years represent a step change in the capacity to store, process and transmit data – more than at any other time in human history and have underpinned some broad spatial transformations of global society (Castells, 2010; Jones, 2009). It is what Henri Lefebvre would refer to as a change in relations of production in the context of the production of space (1991). The unpacking of the complex relationship between digital technologies and organizational space has significant implications for IS given how critical space is to organizing. The importance of an understanding of this process has been evident to many researchers in organizational studies, but has yet to take hold in IS.

One of the most obvious manifestations of changes to organizational space facilitated by ICT is the possibility of remote work. The idea of using ICT for working away from the office is not a novelty by any means. Telework, for example, has been around since the 1970s and appears to be growing dramatically in the last few years. Despite a lack of recent statistical data and a problem in defining what constitutes the practice (Bailey & Kurland, 2002), the evidence of its rise is very solid. Although telework – a term coined by Jack Nilles in 1973 – has been associated historically with the emergent practice of working remotely, myriad terms have appeared lately: mobile work, agile work, distributed work, remote work, smart working (in the UK) and workshifting (in Canada) (Lister, 2016). These terms evoke various aspects of the transformation of work happening over the past decade or two. Some of the most visible evidence of this transformation from a spatial perspective are headlines such as 'The office is dead! Long

live the office!' (Maitland, 2016) or, on the public policy front, the decisions by the UK Government to extend flexible working rights to all workers (2014a) and the European Commission to implement telework and flextime policies as part of their modernization programme (2015). The somewhat fragmented statistical evidence confirms the underlying trend: up to a quarter of workers in the US telework at some frequency (Lister, 2016) and at least a third of the UK labor force works remotely all or some of the time (2016b). Both reports forecast exponential growth in the next few years, however some analysts pour cold water on bullish forecasts given the gradual nature of change up to now (Felstead, 2012). Such trends in the transformation of work provide lucrative opportunities for private enterprise and management gurus. Cisco, for example, offers courses and its own suite of technological solutions to "Give companies the ability to deliver physical and virtual workplace solutions that are designed to meet the challenges of today's work styles" (2016). Perhaps adopting a subtler strategy, Citrix (a technology giant like Cisco) funds high profile studies on flexible work by reputable bodies such as the Centre for Economics and Business Research (2014b) or the Work Foundation at Lancaster University (2016b). Books with titles such as "Remote: Office Not Required" (Fried & Hansson, 2013) or the more ambitious "The 4-Hour Work Week: Escape the 9-5, Live Anywhere and Join the New Rich" (Ferriss, 2007) have become bestsellers and specialized consultancy services on how to manage office space and work practices have been growing at a rapid pace.

Telework has been subject of much scholarly work (Bailey & Kurland, 2002; Clegg & van Iterson, 2013; Rockmann & Pratt, 2015; Taskin, 2010) and would seem like a promising area for theorizing the relationship between ICT and organizational space. Rockmann & Pratt (2015) look at what happens to the perception of the office when a large corporation allows its workers to telecommute flexibly. They find that a tipping point is reached once a certain critical mass of employees take up this opportunity and work from home. This tipping point happens when a sufficient number of absent workers in the office discourages others to come in and it eventually results in sustained absences in the office. This, they found, resulted in a reduction in worker motivation and provided some recommendations to manage telework. ICT only figured in this study as the assumed neutral support structure for telework. Taskin (2010) supports the notion of *déspatialisation* of organizations with the arrival of telework. Like in Rockmann & Pratt

(2015), Taskin sees ICT as a support structure which only makes telework and the 'despatialization' of the organization possible. In both studies, it is assumed that ICT is neutral and no further theorizing is necessary to understand the relationship between it and organizational space.

The case of the literature on telework is typical with regards to the theorizing of the relationship between ICT and organizational space in other literatures. However, the absence of organizational space from the IS literature is particularly striking. Just a simple Google Scholar search with the terms "organizational space" and "information systems" demonstrates this paucity. A glance at the tracks for the 2017 International Conference on Information Systems (ICIS) shows that organizational space – or any proximate topic – is completely absent. In comparison, the European Group for Organizational Studies (EGOS) has incorporated three sub-themes with space in their titles for its 2017 colloquium – one of them is even explicitly linking technology and space (Sub-theme 34: Materiality in Organizing: Space, Technology, Artefacts). The Asia-Pacific Researchers in Organisation Studies Conference (APROS) in 2015 had space as one of its central themes. Although space appears to be absent from the IS agenda – especially when looking at conference programmes – a little scratching below the surface is necessary.

At the beginning of this study, in 2013, I attempted a relatively thorough approach to test the initial hunch I had about research on organizational space in IS. For this, I had developed a simple yet rigorous method based on a combination of existing knowledge on IS literature and advanced bibliographic database tools at my disposal. The results of this approach confirmed my initial hunch about the lack of interest in organizational space in IS.

A total of 27 articles were retained from this exercise. The results are summarized in tabular form in Appendix 9.2. Of the 27 articles listed, only 10 of these are from publications appearing on the AIS Senior Scholars' Basket of Journals<sup>2</sup> (Avital, 2014;

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<sup>2</sup> For a justification for limiting to the AIS Senior Scholar's Basket of Journals, see Avital (2014) and Stendal, Thapa, & Lanamäki (2016)

Stendal, Thapa, & Lanamäki, 2016). This result pointed to a certain lack of cumulative research on the relationship between organizational space and ICT in IS. Theories backed by empirical data had yet to be fully developed.

Of course, my literature search didn't stop at that, and as we will see later how the theoretical framework evolved over time, it was imperative I find empirical studies theorizing the relationship between ICT and organizational space. The exercise would prove frustrating since such a link was elusive no matter where I looked. As we will see in the Theoretical Framework chapter, I attempted to adapt Lefebvre's theory of production of space by integrating ICT. It seemed sensible to draw on the most dominant theory in the organizational space literature. It was simply unworkable. Fortunately I was able to locate a study (Leonardi, 2011) that mobilized affordance theory for the study of routines in an organization. Seeing that routines could be conceptually linked to spatial practices, I felt that affordance theory was a promising route. It was therefore decided to commit to this framework and see where it would take us. Practical imperatives required me to focus on operationalizing the framework and forging ahead with fieldwork.

Thankfully, a conceptual model based on Merleau-Ponty's phenomenology of perception was developed with grounding from within the data. The difficult search for a way to theorize the relationship between ICT and organizational space was ceased. However, this could imply some potential missed insights from other studies as well as contributions from this study.

### **2.3 Theory of Affordance**

The expression 'to afford' something has always been associated with the capacity to either spare a resource – such as time for some activity – or to purchase a good or a service. One would say perhaps 'I can't afford to spend time in this meeting with all the papers I need to grade' or 'I can't afford an apartment in this neighborhood'. However, in common parlance, never does the term affordance come to speech. It is a very specific term with a very specific history.



### 2.3.1 Origins in Ecological Psychology

The concept of affordance has its origins in ecological psychology and took form with the work of James J. Gibson in 1977 with the chapter *The Theory of Affordances* in the book titled *Perceiving, Acting, and Knowing: Toward an Ecological Psychology* edited by Robert Shaw and John Bransford. Affordance as developed by Gibson is the range of possibilities offered by an environment to a perceiving being, or as he puts it in a later work, “The *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill” (Gibson, 1988: 119). As the being interacts with the environment, it will perceive available possibilities for action. It is within this context of possible actions – or affordances – that the actor will pursue their objectives. A bird of prey looking for a perch to eat a meal after a long hunt will perceive the ledge on a cliff as offering a safe zone to land and eat in tranquility away from the harassment of scavengers. A squirrel seeking an escape route from a hunting cat will perceive a tree trunk as offering refuge whereas the cat will perceive the tree as an impasse. In these two examples from the animal world, it is these differing perceptions which allow certain species to survive (squirrel) or thrive (bird of prey). The very process of evolution has provided the bird of prey with the ability for flight and the squirrel with the ability to climb trees. Many primates, and even birds, have demonstrated the ability for toolmaking. The New Caledonian crow is known not only for toolmaking, but also for being able to solve complex problems with tools and even fashion toys out of objects available to them in their natural setting. The simplicity of the concept provided to us by Gibson was made clear to me one day as I sat in the forest where I cycle regularly. As I looked around me, I tried to think of what I could do with the surrounding objects. I look at a rock and think of it as a weight, then as a weapon or perhaps a building block for shelter. My perception would depend on my immediate needs. On a windy day, I would possibly see the rock as a weight. In the face of a threat, as a weapon. To take shelter from the wind, perhaps I will use the rock as part of a wall. The rock seems to offer me these possibilities just by looking at it. If I look up to the clouds, none of these perceptions are evident. Rocks call forth actions that clouds do not. The New Caledonian crow for example, is able to perceive the relative density of rocks and is aware of the possibility of water displacement. In a real-life enactment of Aesop’s tale, experiments have shown these animals to select the specific rocks which would displace enough

water in a tube which would allow them to reach the floating morsel of food with their beaks. Some more advanced experiments have even shown them to be able to distinguish between hollow rocks and full ones. These experiments with crows show how the perception of affordances in the natural environment are integral to survival. Just like my perception of the affordances (and lack of) of rocks and clouds shows, human beings are no different from crows in possessing this form of perception. Humans are champion toolmakers, and therefore have the most sophisticated form of perception of affordances. Whether consciously or subconsciously, by design or accident, we actively construct and arrange our physical world according to this perception. We tend to sit on flat and level surfaces that are large and robust enough to support our weight – a cardboard box or the sloping (and slippery) bonnet of a car won't do. In fact, some bus shelters in the United Kingdom have benches that are designed to allow passengers waiting to rest their weight by leaning on a slightly sloped ledge – sitting is impossible. Some benches in the Paris Metro network are likewise sloped and therefore discourage the homeless to lie down and sleep on them. The example of the doorknob is often used to illustrate the notion of affordance, but many other everyday examples can be thought of, such as the handle of a suitcase, a pole on a bus, a light switch, a bannister on a stairway, a spoon, and so forth. Of course, the perceived affordances of these objects depend on what your objectives are at the instant of perception.

J.J Gibson's ideas regarding visual perception emerged at the height of behaviorism in psychology. He rejected the theory on the basis of experiments he conducted and used the results to develop a framework that sees animals and humans being attuned to their environment as they interact with it. This conception of perception is in contradiction with the more dominant cognitive stance at the time which saw animals and humans as passively constructing the world based on stimuli received from the environment. This raw sensation would be arriving to the agent and processed to create an internal representation of the environment, along with feelings of attraction or repulsion (Heft, 1989). Although J.J. Gibson was initially closer to a cognitive stance, he slowly moved towards a more interactionist view of perception where perception was part and parcel of an animal's or human's interaction with the environment. This focus on the relations between agents and the environment became a school of thought within the field of

psychology called Ecological Psychology. The work of J.J Gibson is considered to be the foundation of Ecological Psychology. This school advocates the study of the environment in order to understand perception and behavior in animals and humans (Greeno, 1994). The school's central concept of affordance has remained for long a controversial idea and continues to generate debate in the broader field of psychology (Heft, 1989).

The interactionist views on visual perception of J.J. Gibson would be a radical shift from the more mainstream stimulus-response view of perception. In the mainstream view, agents would be passive receivers of stimuli in the environment with each stimulus generating an automatic response. By studying the visual perception of pilots when landing their aircraft, he realized that perception would not only vary with stimulation, but with the relative motion to the environment of the agent. This means that a person would not necessarily have the same response to visual stimuli depending on whether the person is in motion or not relative to their environment. The type of motion and its variation will also affect perception (Mace, 1977). So, perception for a person walking in the forest will shift when they come to a stop. The same could be said for a person standing in the middle of a rapid flow such as a shallow river and rowing a boat in it. Averse to the term 'stimulus', which Gibson felt would have too many mainstream connotations, he chose to use information to represent the structure of the source of visual perception – that is to say the information carried by light about events occurring in the environment. Gibson made sure to distinguish this conception of information from that of Shannon's theory of information which provides a statistical model for the understanding communication. Information for Gibson, is the dynamic structure of light converging from all angles on a single point of observation. This structure exists independent of an observing agent. The dynamic structure, which is represented as an optical array, evolves with events in the environment. The observation point would be immersed in this optical array. For an animal or a person, the immersion in this optical array exposes them to the entire flow of environmental events. The eye of a person would represent the observation point immersed in Gibson's optical array and would access information regarding environmental events from light reaching the retina. The information would allow the person to perceive whether surfaces of substances are rigid or non-rigid and their geometry. It is how I can distinguish between a cloud and a rock in terms of hardness or softness along with density. The same information will provide

the person with adaptive values of objects or environmental events – in essence its usefulness. How useful is a cloud for my defense from attackers? A rock? These are the affordances Gibson defines within his perceptual system. The opacity of the rock and the translucent nature of the clouds are visual cues. These are important for everyday life – the opacity of a brick wall does not suggest it as a free passage, whereas the transparency of air does. Similar cues are provided through color (for ripened fruits for example) or patterns (the forest landscape as a hiding place for creatures). All of these perceptions are dependent on the size, form and capabilities of the observer. This is why the usefulness of a tree trunk is more evident for a squirrel than a person. The exercise of cataloguing all possible affordances in the environment for all possible creatures is a nonsense. Affordances need to always be considered with a specific creature in mind. As Mace says:

Some typical examples of affordance descriptions of environmental properties are walk-on-ability, grasp-ability, injury, collision and nutrition. One says that environmental properties *afford* the above activities; for example, a coffee cup at room temperature affords grasping by humans. Although defined relative to an organism, affordance relations exist independent of conscious experience or any subjective states of an organism. A persistent surface which is strong enough to hold the weight of an animal can be said to afford support for it whether the animal is in a state of realizing it or not. (1977: 59-60)

Although these possibilities can be considered essential aspects of the surroundings, they can only be defined in relation to an actor situated within it. We are therefore very far from the identification of independent objective properties of objects that one would typically want to undertake in physics. However, Gibson goes even further in his system of perception based on affordances by introducing the concept of modes of attention. It is not sufficient to speak simply of affordances for a given creature at a given moment, this creature must be in a state prepared to perceive these affordances (Mace, 1977). I could perhaps look upon a rock and see it as a ‘use-it-for-hitting-something’ if my mode of attention was that associated with the intention of killing a large spider that had snuck into my tent in the forest. Another time, it could be seen as ‘keeping-sheets-of-paper-from-getting-blown-away-by-the-wind’ when writing some notes on a picnic table in the park. Or, it could simply be just a rock that happens to come into view when looking at the ground and I don’t really pay attention. In these three cases, I would be attuned to the environment, but in different modes of attention. Therefore, I would perceive affordances differently in each one. Heft points out a very important aspect of

affordance theory in ecological psychology, which is that one's behavior is more often constrained than encouraged by the environment (1989). For example, a 2-metre stone wall will more often constrain movement than suggest a surface upon which to paint or lean against. Although the constraint on movement the wall presents to the walker may stop movement altogether, it will most likely only alter the direction of movement of the walker and therefore shape his trajectory in space.

The notion of modes of attention has interesting echoes of phenomenology, and Gibson has occasionally made reference to this current of philosophy studying the structures of experience and consciousness (Heft, 1989; Jenkins, 2008). Although Heidegger never developed the notion of affordance, his idea of being-in-the world incorporated affordance. In *Being and Time* (2007), he uses his famous example of the perception of the 'hammer-thing', and our primordial relationship to it as we take possession of it through sight, touch and movement, to illustrate the notion of 'readiness-to-hand'. The 'readiness-to-hand', or the inherent meaning of 'use-it-for-hitting-something' in this case, are not the result of a cognitive process where objective properties regarding the hammer such as weight, form and manipulability are transformed into an understanding of what the object can be used for. The hammer itself oozes this meaning through interaction, both visual and tactile. It is only when we ponder the hammer for too long, as Heidegger suggests, do we lose this essential meaning of the object. When I do indeed try this exercise with a common claw hammer at home – trying to decompose its function by simply looking at it – I end up seeing a meaningless form which could at times appear to be human. The hammer could stand up on its handle and looking at its profile, the part used to hit nails looks like a face – indeed it is called that – and the claw in the back could look like a mullet-like hairstyle. It is therefore no coincidence that a hammer is formally decomposed into parts such as the face, head, neck and eye. Meanings such as 'use-it-for-hitting-something' are also easily seen in the environment. Walking towards the edge of a cliff, one is immediately seized by a sense of danger which comes from the perception that the cliff is a 'falling-off place'. As explained by Heft, "This meaning is carried in the structure of reflected light. It is a perceivable ecological fact, not a mental construction that is imposed on sensory input" (1989: 3).

Gibson's modes of attention have an even more interesting echo in the work of another phenomenologist that we have seen in our review of organizational space theory, Maurice Merleau-Ponty. The link is through the notion of intentionality. Merleau-Ponty was a French philosopher and contemporary of J.J. Gibson (they were born only a few years apart at the beginning of the last century). Although separated by an ocean (Gibson was based in the U.S.) and perhaps an even wider gulf in terms of discipline, both thinkers seem to have been keenly interested in the relationship between people and the environment, and more specifically perception. This could perhaps be partly explained by the influence of Kurt Koffka's work – and his Gestalt psychology – on the ideas of both. Koffka's assertion that an object appears attractive or repulsive before appearing as being black or blue, circular or square is an explicit critique of the idea of the passive perceiving agent or 'feeler' of pure sensation. Merleau-Ponty wrote "*Je vise et je perçois un monde*" right at the beginning of *Phénoménologie de la perception* (1976: xi) to set the tone for the rest of the work. Merleau-Ponty based much of his work on contemporary neurological studies and other empirical work in psychology, for example amputees.

The world, or landscape as Merleau-Ponty often says, is structure which spontaneously espouses the intentions of an agent at a given moment. The world of a fleeing squirrel will take on a very specific structure composed of escape routes. The squirrel will not need to assess the properties of the bark on each tree to calculate these routes, the tree trunks will take on the character of escape instantaneously at the moment of danger. This doesn't imply of course that the trees didn't exist prior to this moment – they were just as intimately linked to awareness when the squirrel was foraging the ground for food (Merleau-Ponty, 1976). Awareness is used in the case of animals and consciousness for humans which are the subjects Merleau-Ponty was interested in primarily. Much the same way the beam of a searchlight may illuminate a point of focus in the distance whilst keeping the surroundings visible, the beam of intention shifts along the landscape from moment to moment depending on events in the environment. Merleau-Ponty uses the analogy of a diffuse horizon upon which a beam of attention can be focused to illuminate an object. However, this very object would have been present previously in consciousness along the diffuse horizon upon which part the beam of attention has not

illuminated yet. Merleau-Ponty describes these beams of attention as ‘threads of intentionality’.

With striking similarity to Heidegger’s hammer, Merleau-Ponty uses the example of a pair of scissors at hand to illustrate the phenomenal body (1976: 123-124). He argues that one never mobilizes their objective body, but their phenomenal body. A person, when faced with a scissor and the task of cutting fabric into a certain shape doesn’t need to think about their bodies, the movement of the limbs or the manner in which to use a pair of scissors – it just happens because their bodies are already in the world and in contact with objects such as the scissor through perception. Once grasped, the scissors become a hub for action – they call for a certain action for the situation at hand. The phenomenal body is the engine of intentionality from which multiple threads of intention spread out towards the environment (Merleau-Ponty, 1976: 128). Merleau-Ponty describes objects of intention as soliciting the phenomenal body without any form of representation (1976: 161). For Merleau-Ponty, it is only when a person adopts the right attitude, with all of the associated threads of intentionality radiating from their phenomenal body, that an object will be activated to solicit a certain action on the part of the body. In other words, it is only in the presence of a certain attention on the part of the person that an object in the environment will come alive with a call for certain acts or reactions. Going back to the analogy with the searchlight, it is when an object is illuminated that it becomes potent with action that beckon the person’s phenomenal body. Merleau-Ponty uses the example of seeing blue or touching a hard surface to illustrate this point – he says that it is only when he has the right attitude looking at an object, that he will see it as being blue or hard (1976: 248).

The body was very important for Merleau-Ponty, and he developed the notion of the body-schema. The body-schema is, unlike the objective body, the phenomenal body being in the world but also projecting a certain environment with radiating threads of intentionality. It is ‘pre-logical’ in that there is no need to calculate or ‘think’ about what the body is doing or exactly where each limb is or how far the handle is from the hand (1997: 269). When one sits at the dining table, one doesn’t need to think about how they will mobilize their members and their mouths to eat dinner. The body-schema is the being-in-the-world which means that the body is not separate or contained in the world,

but just in it and the fork is touching the hand just as much as the hand is touching the fork. There is no order or causal process of interaction through raw sensation and mechanical motion, the body-schema is what allows us to be-in-the-world without having to think about it. Just try the experiment of calculating the movements of your hand to pick up your smartphone on your desk as if your arms, hands and fingers were simply mechanical assemblages like on a robot. It seems completely unnatural and the tendency is to simply stop the effort of thinking and allowing the natural flow of movement to take over. This is the body-schema in charge. The associated notion of the proper body simply conceptualizes the phenomenal body as the envelope from which the body-schema is in the world. In order to be phenomenologically in-the-world, one cannot think of their bodies as a mechanical assemblage of parts which act together much like a robot with calculated actions and judgements. In much the same manner, perceived objects are assimilated into the environment projected by the phenomenal body activating their actionability. The objects are quasi-extensions of the body in that they are neither external nor internal (as a mental representation), but transcendent. This is perhaps the most difficult notion to grasp, since we all grow up believing objects are appropriated by the senses and recreated in a mental space which we can then manipulate. However, according to both Gibson and Merleau-Ponty, what's 'out there' and 'in your head' are the same thing as far as perception is concerned. Mace coined the aphorism "ask not what's inside your head, but what your head's inside of" (1977) – the title of his chapter – to condense Gibson's thinking. This idea is exactly what Merleau-Ponty tries to convey when he says "*La pensée n'est rien d'«intérieur», elle n'existe pas hors du monde et hors des mots*" (1976: 213).

Merleau-Ponty provides us with some helpful concepts and a certain philosophical foundation to complement J.J. Gibson's theory of affordance. The concepts of intentionality and the body-schema allow one to escape from the undeniable tendency to see affordance as a process involving various steps, or transactions, between the organism and the environment. The term transaction is often used by some to explain affordance and that it is not the result of raw sensation or cognitive deduction where there is a strong separation between the subject and the object. However, transaction implies a process, a number of steps to follow. It is a term which still seems to evoke a strong separation between subject and object – after all, a transaction in common



parlance refers to an exchange between two social agents. This is far from the phenomenological affordance perceived by organisms and people which can only be seen as a unitary phenomenon at a specific moment. There is no object or subject, but pure perception, experience and action. *“Ce n’est pas la conscience qui touche ou qui palpe, c’est la main, et la main est, comme dit Kant, un «cerveau extérieur de l’homme»”* (Merleau-Ponty, 1976: 365)

Merleau-Ponty also contributes to an extended understanding of Gibson’s affordance in light of the fact that the latter has largely been focused on visual perception and could be easily thought of as being restricted to the field of vision – only what can be seen by the observer’s eye counts. However, as Merleau-Ponty points out, we ‘see’ just as much in front of us, all the way to the horizon, as behind us. Just the same way we could visualize a phonograph (or television to be more up to date) that we could hear in the room next door, we see objects that are beyond our physical field of vision. There are always hidden surfaces on the objects of our everyday, but we can easily ‘see’ them (Merleau-Ponty, 1976: 321). A coffee mug turned in a certain way obscuring the line of sight to the handle will be ‘seen’ with its handle. We ‘see’ the front of a car which is driving in front of us. When we call to a friend as they walk away, we always ‘see’ them as whole – the face is ‘visible’ at all times. Likewise, as we sit in our chair at our desk, we ‘see’ the bookshelf behind us along with the rest of the apartment without needing to turn around or get up from our chair. The beam of light used earlier to illustrate Gibson’s mode of attention therefore doesn’t necessarily limit visual perception to the circle of light, but it has much further reach and reverberation than one would think of when considering vision objectively.

As mentioned earlier, Gibson’s ideas on perception caused waves in academia, particularly in the field of psychology. His ecological approach to visual perception was swiftly criticized by colleagues in the field, but solicited sufficient interest from others to spawn several studies using this approach (Gibson, 1988). An International Society for Ecological Psychology was instituted in 1981, holding meetings every other year, and the journal *Ecological Psychology* started publication in 1989. The theory of affordances expounded by J.J. Gibson is by his own account, incomplete (Stendal et al., 2016). Mace even qualifies it as being a meta-theory requiring further development (1977).

Nevertheless, Gibson's ideas have had an impact beyond his own area in diverse fields such as anthropology, archeology, architecture, complex systems, design, ethnology, film, musical performance, musical appreciation, philosophy and sociology (Gibson, 1988: xxvii-xxviii).

### 2.3.2 Uptake beyond Ecological Psychology

It is in particular Gibson's concept of affordance which has found uptake far and wide. This is largely credited to Donald Norman's book 'The Psychology of Everyday Things' (1988) which examines the relationship between the subject and the object in design. Norman's work is very much focused on how the design of everyday objects such as kettles, door handles and all appliances with buttons depend on the principle of affordance and how users of these objects intuitively appropriate them in-use. Norman applies Gibson's ecological psychology to the engineering of everyday use of technology. Better design of technology leads to better outcomes is the premise of Norman's book and it has been particularly influential in the interactive design community (Gibson, 1988). As is to be expected, Norman and other researchers either skew or depart from Gibson's original notion of affordance in order to fulfil their objectives. For example, according to Siegert, Norman "distinguishes real affordances (features, properties) and perceived affordances" (2015: 49), which is a conflation of physical properties and Gibsonian affordances. In Gibson's theory, affordances can only be perceived and cannot be independent of the perceiver. This makes the notion of 'real' affordance either confusing (because it is really just referring to physical properties) or evidence of a misunderstanding of one of the principal difficulties Gibson was attempting to overcome with his work – the subject-object duality. Another source of confusion is the use of the term 'constraint' in opposition to affordances (Leonardi, 2011; Leonardi & Barley, 2010; Majchrzak & Markus, 2012; Norman, 1999: 41; Riccio & Stoffregen, 1988) since affordance integrates the notion of constraint. If one's environment calls for a certain action, and hence perceived affordances, it is by definition constrained since other, objectively possible actions, are not perceived. These are unfortunate departures from Gibson's original thinking as we lose much of the power of the theory to overcome the subject-object dichotomy. However, Norman's influence on the social sciences – most notably in studies of technology – is indisputable. The intense application of Gibson's

affordances in technology studies, such as ergonomics or human-computer interaction, has spawned new theoretical insights and practical applications. This shouldn't be surprising, as Jenkin's notes, since it is in these areas that lie the most accessible illustrations of affordance (2008).

As we have just seen, and just like organizational space theory, the tension between object and subject is ever present in applications of affordance theory. According to Heft, affordances have both objective and subjective qualities (1989). Meaning and properties are inseparable. Phenomenologically speaking, affordance is a unitary experience encompassing the perceiver and their environment at a given moment. The absolute subject-object is explicitly rejected by Gibson (Fayard & Weeks, 2014). Ian Hutchby's paper 'Technologies, texts and affordances' (2001) is a poignant and elegant call to avoid falling into the trap of either technological determinism or radical constructivism by mobilizing the theory of affordances. Hutchby was responding to a recent and quite forceful anti-essentialist movement in the sociology of science and technology. He gracefully countered many of the radical constructivist arguments by re-interpreting their empirical studies with affordance theory. It seems Gibson provided a theoretical escape route for many studying technologies who felt trapped between perspectives based on realism (artefacts determine the actions of individuals) and those based on constructivism (individuals and their discursive actions determine the real properties of artefacts). Although Hutchby's call hasn't been left unheeded, many scholars continue to operate at one point on the spectrum that is bounded on both ends by objectivism and subjectivism. Although Norman has somewhat attempted to limit the damage (1999), the tendency to privilege one over the other is very common in studies mobilizing affordance theory, especially those regarding technology.

As Gibson's theory of affordance is mobilized for various investigative aims, a certain fragmentation into different categories and types of affordances is inevitable. We now for example have social affordance, cognitive affordance, physical affordance, sensory affordance and functional affordance (Jenkins, 2008). Much of this typology has been generated within the human-computer interaction (HCI) design literature. Fayard & Weeks (2007) see both Gaver (1996) and Hutchby (2001) as paving the way for the use of affordance theory in the study of social interactions and attempt to develop a theory

of social affordances of informal interaction. Although social affordance theory has been developed in the HCI design literature, Fayard & Weeks, along with some other researchers (Van Dijk, Berends, Jelinek, Romme, & Weggeman, 2011) have used affordance theory for the study of materiality (not exclusively ICT) and social interaction within organizational settings. In their 2007 article, Fayard & Weeks look at how certain liminal spaces in workplaces afford informal interaction which would otherwise be difficult. In a later article, Fayard & Weeks (2014) propose to shift the focus from affordances of technologies to affordances for practice. This can be seen as an attempt to develop a theoretical apparatus which helps researchers avoid the trap of technological determinism and focusing their study excessively on the technological artefacts rather than how these artefacts are used in practice. However, apart from these studies, the vast majority of studies mobilizing affordance theory to better understand organizations and organizing, focus on the affordances of ICT. It is therefore principally through the IS field that organization theory has benefitted from Gibson's ideas.

### 2.3.3 Affordance in IS

The Gibsonian theory of affordance entered the field of Information Systems through HCI research. Looking for a better way to design computers or other devices, scholars found Gibson's ideas appealing and useful. The purpose of design is, after all, to render objects of everyday use as **usable** as possible. Discussions about Norman's (1988) appropriation of affordance for the purpose of design has generated a robust theoretical foundation in the design literature, and more specifically in HCI thanks to the efforts of William W. Gaver (McGrenere & Ho, 2000). However, as is normally the case when a theoretical concept is appropriated in one field by another one, much criticism has been made about the manner in which Gibson's ideas have been interpreted and circulated within the HCI literature. Since it is thanks to Norman that the HCI community has appropriated Gibson's ideas (Stendal et al., 2016), it is of no surprise that a distinctly 'Norman perspective' (Faraj & Azad, 2012) has taken root in their research. Faraj & Azad are critical of the 'affordance-is-in-the-object' view that the 'Norman perspective' implies. They see it as reducing Gibson's ideas to an instrument in determining what 'good' or 'bad' could be and neglect the variability of contexts and users for the object in question.

The concept of affordance is not well established in the IS literature and there is a wide variety of interpretations (Pozzi & al. 2014). Hutchby (2001) was the first to apply the concept of affordances to ICT artefacts (Pozzi & al. 2014) in demonstrating the technological shaping of sociality. However, it is only much more recently that the IS community has adopted the concept and, therefore, lacks maturity (Stendal et al., 2016). A few reviews of how IS researchers have mobilized the concept have been conducted and all conclude that the concept is in its infancy in how it has been adopted for IS (Pozzi, Pigni, & Vitari, 2014; Stendal et al., 2016).

Many calls for a new approach to overcome the technical-social divide in IS research have been made, with some specifically calling for the mobilizing of affordance to address the determinisms present in the more recent literature (Faraj & Azad, 2012). Specifically regarding affordances, many saw the concept as a way of bringing back the material into the conversation (Bardini, 1996; Faraj & Azad, 2012). Some also saw it as one manner of taking a sociomaterial perspective on studies of technology in society or organizations (Faraj & Azad, 2012; Leonardi, 2011; Ulmer & Pallud, 2014). Beyond the overcoming of dichotomies and determinisms, it would make sense to mobilize the concept of affordances if one seeks to provide materiality – or the Gibsonian environment – with its rightful attention in any study of how people interact in society or in organizations. The concept of affordance itself calls upon our intuition about the non-negligible influence our environment has on our moods, our relationships and certainly on how we get around. The material world cannot be set aside for the study of any social phenomena.

As we have seen in the HCI literature, Gibson's affordance has undergone much fragmentation and reinterpretation. The same process is observable in the manner in which IS scholars have appropriated the ideas from Ecological Psychology. Not only do we see n types or levels of affordances emerging, they often end up on either side of some well-worn dualisms – subjective/objective, structure/agency, determinism/voluntarism, simple/complex and material/social. What is ironic is that in appropriating Gibson's ideas, many researchers were seeking to overcome these historical dichotomies. Frustrated with how other approaches such as duality-of-

technology, technology structuration, and technology-in-practice have failed to overcome these dichotomies (Faraj & Azad, 2012; Leonardi & Barley, 2010), IS scholars have turned towards affordance theory only to reproduce the very framings they were attempting to flee.

Faraj & Azad deplore the superficial development of affordance that is evident in the IS literature (2012). For example, Zammuto et al. (2007) propose five types of affordances reflecting the features of technology and organizations considered simultaneously, which according to Faraj & Azad simply account for technology as an external force to the organization and that each is considered to be a distinct entity characterized by a certain set of properties. We are very far from the notion of affordance put forward by Gibson where there is a unity composed of the agent and the environment and back into the subject-object dualism. The vast majority of IS articles either theorizing or mobilizing affordance theory resort to some form of categorization which nullifies the unitary approach Gibson originally proposed.

Stendal, Thepa and Lanamäki have produced an up-to-date and quite incisive literature review of the concept of affordance in the IS literature (2016). They raise many questions which reveal the confusion around the concept of affordances reigning in IS. Using a systematic method for locating articles based on Boell and Cecez-Kecmanovic (2014) along with Webster and Watson (2002), the authors find 12 articles in the AIS senior scholars' basket of journals. The fact that only 12 articles working with the notion of affordance were found in the top IS journals indicates how emergent the concept is in the field. Furthermore, the authors found that the literature defined affordances as containing 'object with properties', 'actors with goal', 'action possibilities', and 'actor's capability' (2016: 5274). We see that the object-subject nexus reappears and is stronger than ever. The recurring definitions could also indicate that IS scholars are more dependent on the HCI literature than Ecological Psychology and Gibson's original work to their understanding of the concept of affordance. There is quite a strong design orientation to the terminology, and indeed much of IS research is concerned with the design of information systems in organizations and how to make them more usable. Thus, the reviewers found that the mainstream of IS research on affordance is entitative (concerned mainly with entities). The authors also found that most of the articles were

not clear of where affordance was found in their objects of study. They go on to suggest that IS researchers may attribute a name to an imaginary affordance and then proceed with looking for what they have made up. The process by which affordances 'emerge' is missing from the research so far according to the authors. Another aspect of the reviewed literature which didn't seem to impress the authors was that the reported affordances were all functional – that is to say defined as being independent of the actor. The authors also raise a number of questions regarding the reviewed literature; what is the purpose of introducing the notion of constraints (such as Leonardi (2011)) if it is already implied in affordances, and if we are to stick with the notion of constraints, what is its relationship to affordances? Despite these questions, constraints seems to have become accepted as the pendant to affordances and we now have 'Technology Affordances and Constraints Theory' (Majchrzak & Markus, 2012). Perhaps this is due to the common understanding of the word affordance as something which allows or permits rather than constrain. Such common interpretations of affordance would be quickly remedied by a thorough understanding of Gibson's original ideas along with a review of how his ideas have progressed into the field of IS through the HCI literature. A reading of Yvonne Roger's paper would be a good step in that direction (2004).

Perhaps quite representative of the state of confusion is another literature review written by Pozzi, Pigni and Vitari (2014). The authors also follow Webster and Watson (2002) in their methodology, however don't specify clearly their method of selecting the journals to search for articles for review. They found 25 articles for in-depth review, which although double the number, is similar in scale to the review performed by Stendal, Thepa and Lanamäki (2016). Pozzi, Pigni and Vitari include journals from Management and Organization Studies such as Academy of Management Review and Organization Science for their review, whereas Stendal, Thepa and Lanamäki limit their review to the top IS journals. The conclusion from both numbers can only be that the affordance lens is still in its early years in IS research. In a surprising move, the authors choose to use to structure their review the framework developed by Bernhard, Recker and Burton-Jones (2013) investigating affordances in information systems with the purpose of producing a conceptual process model. This model would be destined for designers of information systems and therefore have a very design-oriented view of affordances. Furthermore, this model would not allow Pozzi, Pigni and Vitari to let

definitions and concepts emerge from the literature. Instead, the result is a review classifying the literature according to support for each of the stages in the conceptual process model. This model, composed of a series of constructs connected by a temporal-causal relationship, assumes that affordance can be expressed as a process of four stages: cognition, recognition, behavior and effect. Not only is characterizing affordance as a four-stage causal chain of events completely incompatible with the original Gibsonian unitary notion, it describes affordance as the result of a cognitive process which is precisely what Gibson was trying to move away from in developing his concept. These are radical departures from how affordance is developed in Ecological Psychology and even how the notion is mobilized in the HCI literature. Despite this, no explanation or justification for these departures are provided, and therefore support the observation made by Stendal, Thepa and Lanamäki (2016) that the imagination of scholars fills much of the gaps in the development of ideas around affordance in IS. There is one interesting detail provided by the Pozzi, Pigni and Vitari review and that is that only 8 of the 25 reviewed articles were empirical studies based on primary data. This further supports the judgment that affordance is in its early days in IS.

Granted the two reviews discussed above are conference papers and not articles published in peer-reviewed journals, but they both reflect – each in their own manner – the prevailing lack of depth in understanding of affordance theory. Stendal, Thepa and Lanamäki (2016) make the point of questioning the soundness of the appropriation of the notion of affordance in much of the IS literature reviewed. Pozzi, Pigni and Vitari (2014) on the other hand seem to reproduce the same lack of depth in understanding as the literature they review. Both are evidence that much work needs to be done in IS to develop an understanding of affordance theory and of how it has been appropriated – or misappropriated – in other fields. Otherwise, the concept of affordance risks becoming just a shell devoid of any conceptual vigor and used as a label for already established notions which were in need of a makeover. IS scholars need to also ask themselves whether the concept is appropriate for the study of information systems. Kaptelinin and Nardi (2012) judge Gibson’s concept of affordance to be inadequate for the conceptual needs of HCI. Others in the HCI community believe that the concepts origins should be revisited: “As the concept of affordances is used currently, it has marginal value because it lacks specific meaning. Returning to a definition close to that of Gibson’s would



solidify the concept and would also recognize that designing the utility or functional purpose is a worthwhile endeavor in its own right” (McGrenere & Ho, 2000: 8) or

The downside of the concept of affordance being popularized in this way is that the richness and contextual background of the original theory has been lost, making it difficult to appreciate its significance other than at a superficial level. Some may argue that this does not matter since it has provided designers with a new way of thinking and talking about design that they did not have before. However, others would argue that it can distort their way of thinking about interaction design to the extent that it overly constrains the way they do design, as satirized by Norman in his CHI-website quote. (Rogers, 2004: 10)

Similar critical reflexivity needs to be injected in the IS literature dealing with affordance theory.

In addition to Leonardi’s study of computer simulation technology for automotive design (2011), which appears in both of the previously discussed reviews, the following empirical studies mobilizing affordance are of note: Thierry Bardini’s study of mouse buttons (1996); Anne-Laure Fayard and John Weeks’ study of informal interactions in photocopier rooms in three organizations (2007); William Gaver’s study of the physical properties of paper and electronic media (1996); and, Galadrielle Ulmer and Jessie Pallud’s study of Enterprise Social Networks (2014).

Leonardi’s study of computer simulation technology for automotive design is of particular interest since it has provided theoretical contributions to the notion of technology affordance based on empirical work (Faraj & Azad, 2012). Paul Leonardi looked at how engineers in the automotive industry were afforded or constrained by ICT in their daily routines and how constraints were often overcome by adapting the ICT to their needs (Leonardi 2011). In this study, Leonardi develops a conceptual framework relating the essential properties of ICT with the daily routines – or practices of the engineers – to analyze how they responded to the affordances on offer from, and constraints imposed, by the technology. He also develops the concept of organizational infrastructure supporting daily routines, and how these daily routines in turn construct this infrastructure. The key idea in Leonardi’s study is the metaphor of imbrication between human and material agencies enacted by daily routines. Like Lego bricks, human and material agencies are distinct but interdependent blocks which can be conjoined through imbrication. People, by either shifting their daily routines or

modifying material and social agencies, will reconfigure the material and social environment in a sociomaterial flux. It will be through the affordances (and constraints) of the existing environment – or framework as Leonardi calls it – that these changes will be affected. These changes will in turn produce new affordances or constraints in the environment, which in many cases will be intended by the users. However, as others note, Leonardi does not detail how this mechanism works by pointing out how the existing affordances (or constraints) emerge in the first place and then how these are reconstructed to re-emerge so as to be perceived in the way that is intended (Fayard & Weeks, 2014). The questions asked by Stendal, Thepa and Lanamäki (2016) regarding the introduction of the concept of constraint as a complement to affordance remains valid. Despite these critiques, Leonardi is one of the few to have produced a comprehensive framework based on empirical support and therefore allow others to produce their own insights into affordances of technology. This is why Ulmer and Pallud chose Leonardi's framework as part of their sociomaterial approach to study Enterprise Social Networks.

When considering affordances of ICT, there is a significant break from other material artefacts in that the form rarely reveals the function through perception (Kallinikos, 2012). For example, the function of a tool such as a hammer or a screwdriver is far more obvious than that of a software. This break between form and function has phenomenological consequences in that affordance for ICT is perhaps much more dependent on, say, Bourdieu's habitus than for other aspects of the environment. So with use over time – perhaps starting off with a training course – people develop habits which mean certain features or properties of ICT modify the environment and hence their perception of affordances in the environment. It is as if the rock or the cloud has been transposed into the office in the form of an ICT artefact – it becomes part of the environment and therefore of the affordances perceived by an individual. This phenomenological point is of importance in order to move beyond the issues identified above regarding the interpretation of the concept of affordance. When IS scholars seek to return to the material in their studies of ICT in organizations, they will logically focus on a technological artefact. This has been called for by many scholars, especially those advocating a sociomaterial approach to IS research (Orlikowski & Iacono, 2001; Weber, 2003). Although this is an appropriate call for many types of research investigating ICT

in organizations, it is not so for affordance studies unless explicitly departing from Gibson's ideas, in which case affordance, as mentioned earlier, becomes an empty conceptual husk. One might as well adopt more classic concepts from design literature such as properties and features. Affordance is a holistic concept which requires a phenomenological approach in order for it to be useful in producing insights into how technology affects organization and the social world more broadly. Affordance originates from ecological psychology for a reason – it is all about the environment and those beings which are part of that environment. Whether considering a built up or natural environment (like a pristine forest or a barren desert), we perceive affordances as wholly belonging to our experience in this total envelope. Isolating affordances to one particular part of the environment – say a sidewalk or a dune– would be obfuscating everything else that is part of the experience of either being in a city or a desert. If one walks on the sidewalk or climbs atop a dune, it is not as if these acts and entities exist in a vacuum or in isolation, but are part of a total experience. Walking on a sidewalk in a deserted city – apart from pure habit – would seem bizarre. When city streets are pedestrianized for festivals or other events, most walkers feel the street offers them a freedom and space which the sidewalk doesn't offer. When a Tuareg nomad climbs up a dune, he does so with the awareness that there will be an unobstructed view of the surroundings once at the top. The 'walkability' of the sidewalk or 'lookoutability' of the dune are completely dependent on the surrounding physical environment – in the case of the dune, this could be the relative height of surrounding dunes, whether it is daytime or night, whether there is a sandstorm or not, whether there is a risk of quicksand, etc. Also in the case of the dune, these could be coupled with social factors such as whether an enemy lurks behind the dune or whether only the eldest of the group is allowed to climb the dune. All of these will have a contribution to the affordance perceived by the individual moving within this environment, of which he or she is a part of. Although investigation of affordance in the IS literature have considered contextual factors for their study, they are almost always exclusively focused on the social and take the physical as the artefact in isolation. It is for this reason that IS studies of affordance need to consider how ICT affects the environment and hence the affordance perceived by those moving within this environment. Isolating the ICT artefact from the rest of the physical environment impoverishes any insights and make them less transposable to other areas of study. Unfortunately, the history of the IS field along with the recent calls

for a material turn have pushed researchers into narrowing their focus onto objects which are in reality part of a wider 'infrastructure' which composes one's environment.

A call for a phenomenological or holistic approach comes from Turner (2005) in the HCI literature, but doesn't seem to have resonated in the IS community. Turner reminds us that affordance, use and context are one. He goes on to suggest that for the purpose of design, it may be better to conceptualize affordance as a boundary object between use and design for use.

Since we are interested in organizational space for this study, it is interesting to note that the concept of affordances has already been used for spatial considerations in previous studies in the HCI literature (Gaver, 1991). In his paper, Gaver develops the twin notions of sequential affordances and nested affordances. Sequential affordances "explain how affordances can be revealed over time" and nested affordances describe affordances that are "grouped in space" (1991: 82). The idea of considering how affordances are grouped in space is a step in the direction called by Turner (2005).

Although, not responding to the call by Turner (2005) for a more holistic approach to the study of affordance, some IS research attempts to provide a more balanced framework. This is what Fayard & Weeks propose in *Affordances for Practice* (2014) by taking into account social affordances alongside technological ones in order to avoid a deterministic approach. In their view, practices in organizations are underpinned by the range of social and technological affordances offered to actors by the environment. These sets of affordances are described as affordances for practice.

As we have seen, the concept of affordance has not only been developed in terms of the possibilities offered by the interaction an actor has with the environment, it has also been described in terms of constraints (or limitation of possibilities). The result of the actor-environment interaction therefore can result in constraining action just as easily as affording it. If we are to accept affordance rooted in essential properties of the environment, the same essential properties can lead to constraint. In the same way that Fayard & Weeks (2014) entangle the social and technological, constraint is dependent on the social context as much as affordance. Although the explicit consideration of

constraints as the other side of the same coin as affordances is limited to psychology (Ricio & Stoffregen 1988), it is frequently presented as its pendant in more recent literature in Information Systems, Organizational Studies and Management (Majchrzak & Markus 2012). Affordance and constraint are therefore conceptually the result of the same situated interaction between actor and environment. With this view, the concept of affordance incorporates both possibilities and constraints at the same level.

#### **Inset 4: Making the link between Gibsonian affordances and ICT with distraction?**

A television advertisement shows a sequence of apparently headless and armless people from behind as they walk in the street. What is this advertisement for? Seems a bit creepy at first. In the end though, the heads and arms pop right out and we realize that they have been busy on their mobiles the whole time. Such a scenario doesn't end up being creepy at all for a contemporary audience. The experience of having to walk with people absorbed by the tiny screens of their mobiles is almost a daily occurrence. We end up doing it ourselves. Our perceptions of space and our movement through it are altered as we try to split our attention between a new message and trying not to (embarrassingly) walk into others or a lamppost. Where are we when this happens? What happens to our embodied presence? Are we there in the street or out there in cyberspace? Could it be both at the same time?

There seems to be a lot more going on here than what happens when one loses sensory awareness of surroundings by listening to music or reading a book. When listening to music in public, we are somewhat isolating ourselves from the audible environment. This could be the aim, but often it is because listening to music is enjoyable, especially when it can be done anytime and anywhere. On top of making the listener unaware of the audible surroundings – which can prove to be dangerous in the urban environment – they are in part socially isolated. Although visual interaction remains possible, a person with a pair of headphones in their ears will likely be seen as unapproachable for spontaneous conversation. Perception and experience of space by the listener and those around (others may steer clear while walking behind because the person can't hear footsteps or sit further away because of the disturbance caused by the volume of the music) is modified by the use of the listening device (Tuan, 1977). A book (including electronic ones) engages the reader in a completely different manner. It needs to be held and requires sustained focus. Reading is much more cognitively intensive than listening to music and will divert the reader's attention away from much of what is happening in their surroundings. This is perhaps why it is more common to see people listening to music while walking rather than concentrating on a book. A book also allows the reader to engage with it when it is convenient and not too distracting. Perhaps when sitting on a commuter train or at bedtime. Regardless of how absorbing a book can be, it will never ring or vibrate for attention. The same applies to basic portable personal music players.

Mobile phones, along with other mobile connected devices, are a different kettle of fish altogether when compared to the above examples. Two key differences can be noted. First, mobile connected devices have the ability to interrupt. Calls, reminders and messages can pop up at any moment and demand the user's attention. Second, and related to the first one, they demand a much higher intensity of engagement from the user than a book for example. These two differences stem from the intensity of interaction offered by mobile connected devices – interactions with others who are normally not co-located. This is something that never existed before on such a massive scale. When on a call with someone over a mobile or texting via SMS or social media, attention to the conversation cannot easily be coordinated with what the immediate surroundings impose upon the user. As a result of design (manufacturers, operators and businesses are clamoring for attention to make a profit) users are constantly bombarded with alerts and messages. The very human desire to stay in touch with others (especially when fast responses are expected) will mean that most interruptions will at least be given some consideration. Is it someone I want to hear from? Is it an important document? Even when nothing is chiming, they will regularly check their device in case anything has been missed. Chatting (online) with others (especially when sitting next to each other) is a great way to beat boredom during a presentation. Mobile connected devices pull one's attention away from the immediate embodied physical space and transport them to another space – cyberspace.

## 2.4 Theoretical Framework

This chapter requires some explanation. As mentioned in the introduction, this chapter would have been expected in the Research Design section. However, given the constant evolution in the conceptual model during the study, I thought it would be appropriate to tell the story of this theoretical journey from within the Theory section. Before embarking on this journey, it would be beneficial to have an idea of the planned itinerary.

As with many qualitative research undertakings, the development of the theoretical framework followed a non-linear iterative process. Given that there was very little theorizing of the relationship between ICT and organizational space in the literature, it was most sensible to start with either a completely grounded inductive approach or an abductive one. In the abductive approach, one could start off with some intuitions based on existing theorizing in the literature regarding both organizational space and information systems (Alvesson & Sköldbberg, 2009).

According to Silverman (2008), a researcher needs theory in order to critically understand the phenomena they are studying and organize accumulated knowledge. He cites Strauss and Corbin 'Theory consists of plausible relationships produced among concepts and sets of concepts' (1994: 278) in making the point that without these concepts and interrelationships, the cumulative scientific approach to understanding our social world is impossible. At a more practical level, theory also serves as a sensitizing device (Walsham 1995) in the undertaking of fieldwork for the study. With these two principles in mind, we can develop a theoretical framework for studying the relationship between ICT and organizational space.

The process of theorizing was in reality experienced in two broad phases, each corresponding to the two phases of data collection in the field. The details regarding data collection will be covered in the Research Design section – the phases are labelled exploratory and intensive, but they correspond to discovery and exploratory as defined by Benbasat, Goldstein and Mead (1987). The labels given to each phase of this project are more reflective of the manner in which the research played out in each phase. Each

of these phases would also be divided into two subphases corresponding to the stage of evolution of the theoretical framework and progress in fieldwork. The framework at each phase and subphase are now exposed along with some explanation of how fieldwork provided support for intuitions or new elements to help in the development of the framework. The final theoretical framework will be presented in the discussion after the findings section.

Although a study on spatial practices of the workaday in the context of globalization and change cannot ignore temporality, I explicitly put considerations of temporality to the side in order not to increase the complexity of the theoretical model. Instead, I will take an inductive approach to temporality in this research by letting this dimension manifest itself in the data and analysis. This is inevitable given that any examination of spatial practices will yield insights into the temporality of such practices. The reverse is equally valid. Temporality will therefore be looked at, in relation to spatial practices, in the discussion section.

#### **2.4.1 Phase 1: Exploratory**

In the exploratory phase, the framework started off with the most robust and accepted theory for organizational space – Henri Lefebvre’s theory of the production of space (1991). The framework only slightly changed after additional literature review and data collection. In the exploratory phase, the theorization of ICT is much less developed than in the intensive phase. Each subphase of the exploratory phase is presented below.

##### ***2.4.1.1 Subphase 1.1: Discovering what space means for different actors in the business school environment***

In this subphase, the approach was very grounded given that no model had been developed or evolved from the literature review conducted up to that point in time. The only strong theoretical element is a good understanding of Henri Lefebvre’s theory of the production of space (1991). This was based on an intuition that this theory was the most promising, along with the fact that it was the most prevalent in studies of organizational space. Unfortunately, theorizing ICT with Lefebvre’s ideas proved difficult especially since few studies in IS ever consider organizational space explicitly,



let alone mobilize Lefebvrian ideas. Therefore, only some vague Lefebvrian notions such as spatial practices and appropriation/reappropriation of space were used to approach the field. No research question had been developed at this stage.

Although a theory of social practices has been developed by sociologists such as Bourdieu (1980) or de Certeau (1990), and a practice-based perspective has been taken up by many research streams in Management and Organizational Studies (Brown & Duguid, 2001; Geilinger, Haefliger, von Krogh, & Rechsteiner, 2016; Vendelø et al., 2010; Whittington, 2003), the study of spatial practices in organizations has remained limited for many years. This is despite the fact that spatial practices are generative of organizational space and that all evidence points to the importance of space in the organizing process. Henri Lefebvre's theory on the production of space provides the most useful (and used) conception of spatial practices (1991). According to him, a spatial practice allows a member of society to connect daily routines with the network composed of places and routes making up the reality of urban life. It is a practice (within the perceived space of his triad) simultaneously shaping space and shaped by space. It is the perception of space that determines how these daily routines evolve and eventually structure daily life and social reality.

#### ***2.4.1.2 Subphase 1.2: Understanding spatial practices in the context of a business school***

In this subphase, a theoretical model started to emerge after having considered the data collected in subphase 1 to better understand how Lefebvre's theory of the production of space can be mobilized for the study. The theoretical model developed at this stage is the result of a deeper understanding of Lefebvre's work more than new discoveries in the literature. Unfortunately, ICT remained difficult to theorize, however the model at this stage attempts to put it at the center of the framework. The research question at this stage is: How do ICTs and spatial practices shape each other in a higher education setting?

The basis for staying with Lefebvre's theory of the production of space lied in its appropriateness for the phenomenon under investigation – the ongoing mutual shaping of ICT and organizational space – along with its established status in organizational space studies (Clegg & Kornberger, 2006; Dale & Burrell, 2007), including those focused

on higher education (Apple, Ball, & Gandin, 2010; Gulson & Symes, 2007). However, no empirical study of organizational space explicitly using this sort of framework had yet been located.

As we have seen, Lefebvre's theory of the production of space is complex, however, for the purposes of developing the proposed conceptual framework, it was necessary to expand one key idea. Much like Giddens' structuration theory (1984), the production of space is a recursive process where the existing structure of social space concomitantly restricts and enables action to either conserve or change the existing structures. This cyclical process is driven by a series of actions called spatial practices. Spatial practices are social practices which are often taken for granted but shape the space we live in – opening and closing a drawer, walking and not sitting in an office hallway, or hanging a picture at eye-level are just a few mundane examples. The practice of convening students into an amphitheater at an appointed time for lectures is an example of a spatial practice in a university environment. Spatial practices are the animating force of the world we live in on a daily basis according to Lefebvre's theory. One shapes the space of the interior of a building by simply walking through it. Spatial practices yield a space that then shapes these very practices and so forth. This is the core of the proposed framework. Since ICT needs to be integrated into this framework in relation to spatial practices, it will need to be considered as being constituting of spatial practices whilst at same time as being constituted of spatial practices. Essentially, they are both embedded in each other. The resulting framework can be represented schematically as seen in Figure 2.

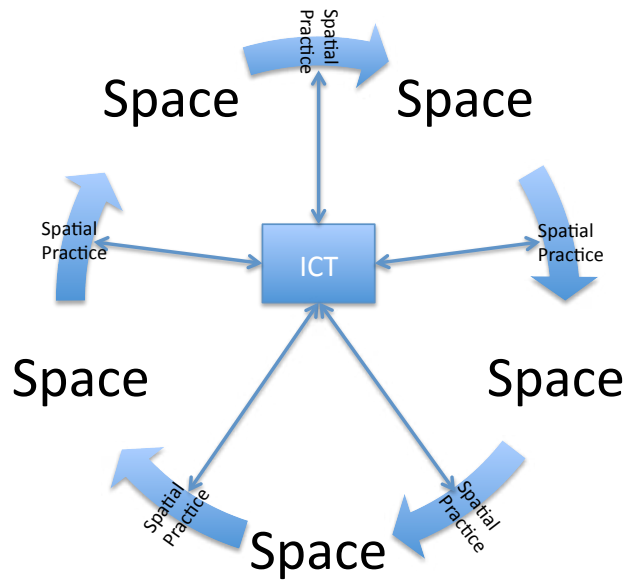


Figure 2 – Framework relating ICT with spatial practices (Author)

Spatial practices are key for the proposed conceptual framework. In order to code and give sense to these spatial practices, Lefebvre’s theory provides a set of associated spatial concepts mainly in the form of dialectics and triplicities such as perceived/conceived/lived space or inclusion/exclusion.

In alignment with the proposed conceptual framework, the objects of study will be a pairing between a set of spatial practices (within a building) and a set of associated ICT artefacts (see Figure 3).

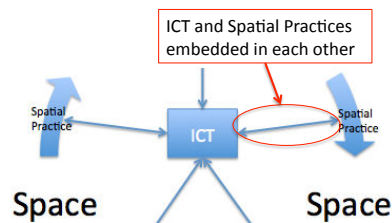


Figure 3 – Pairing between spatial practices and ICT (Author)

#### 2.4.2 Phase 2: Intensive

At the end of the exploratory phase, enough confidence was gained about the nature of the object of study – spatial practices of academics in business schools – to develop a more detailed and supported framework. The exploratory phase also provided some time to make discoveries in the literature and locate new theories that would allow for the integration of ICT into the model based on Lefebvre’s spatial practices. The intensive

phase would produce the most in terms of data collected and the theoretical framework developed would allow for a much more standardized and systematic collection when compared to Phase 1.

#### *2.4.2.1 Subphase 2.1: Examining spatial practices in relation to affordances of ICT*

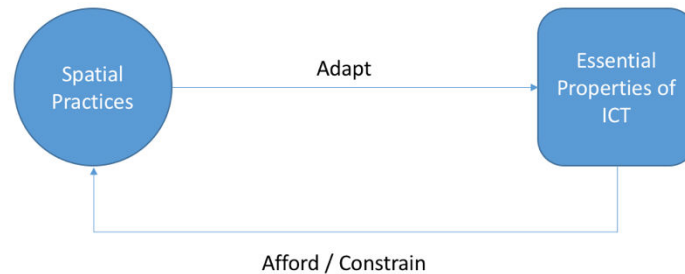
After having been bereft of any theoretical basis to integrate ICT into Lefebvre's theory of the production of space in Phase 1, the discovery of Leonardi's study of computer simulation technology for automotive design (2011) seemed to provide the missing piece of the puzzle, establishing a conceptual link between spatial practices and ICT. The puzzle piece provided by Leonardi was the concept of affordance. We have reviewed the literature on both organizational space and the notion of affordance in information systems and should therefore be able to develop a framework that is grounded in the extant literature and which would allow this study to make a theoretical contribution to both literatures. The research question at this stage is: How does ICT afford the spatial practices of organizations? The framework developed at this point is used for the rest of the study for data collection. The research question mobilizes two main concepts – affordance of ICT and spatial practices in organizations – and seeks to study the relationship between the two.

As seen in the literature review, many studies mobilize Lefebvre's spatial triad when examining organizational space. However, few actually focus on the daily routines in detail. It is at this level that the process of the constitution of space can be broken down into well-defined and organizational parts. Despite this gap in knowledge of spatial practices in organizations, many studies on social practices, more broadly, exist in the literature.

According to the Lefebvrian worldview, spatial practices have a phenomenological basis centered on the human body. The geometric and mechanical properties – the specific manner in which our organs, bones and joints are put together – determine the scope of possibilities for spatial practices. Walking and sitting are some of the basic spatial practices made possible by our bodies and also shared with our primate cousins. More evolved and complex spatial practices such as opening and closing drawers, sitting at a dinner table to eat or just typing away on a keyboard are just as much based on the basic

properties of the human body as sitting and walking. Spatial practices are so taken for granted, it almost seems ludicrous to conceptualize them. Sitting at a desk or walking into a shop are all spatial practices which seem like obvious and inevitable ways of spatially organizing the wide variety of human activity of our contemporary societies. However, as Lefebvre and others point out (Marrewijk & Yanow, 2010), these spatial practices are the result of a combination of what our bodies and the physical environment afford along with a historically contingent social process ensuring one practice becomes institutionalized while alternatives don't. Why sit at a dining table to eat when one can sit on the floor? Any Westerner not ever having been invited to a traditional (often rural) family home in India will find such a question quite strange. That is because spatial practices are the result of social processes that become so embedded in daily routines over time, that questioning them becomes unusual. It is this taken-for-granted aspect of spatial practices that makes their study so challenging and yet incredibly fascinating. Our focus will be on the relationship between these spatial practices and the affordances of ICT.

In order to conceptualize the relationship between spatial practices and the affordances of ICT, Leonardi's study of computer simulation technology for automotive design seems appropriate. By adding a Lefebvrian 'twist' to Leonardi's framework, we can focus on spatial practices (as part of daily routines) and equally narrow infrastructure to organizational space. The resulting theoretical framework can then be visualized in Figure 4. The illustration reflects a process in the ongoing interaction between the essential properties of ICT and the spatial practices of actors in organizational settings.



**Figure 4 - Theoretical framework based on Leonardi (2011) (Author)**

Leonardi (2011) provides two major contributions useful for this study. Firstly, he firmly establishes, based on the literature, the proposition that there is a strong relationship between ICT and organizational routines. Secondly, he proceeds with developing this relationship based on the notions of affordance, constraint and the imbrication of human and material agencies. The organizational routines in Leonardi's study can be considered to be part of spatial practices. Since the relationship between organizational routines and ICT can be conceptualized, so can the relationship between spatial practices and ICT. In order to do this, we will need to adapt Leonardi's framework.

In his study, Leonardi focuses on the imbrication of human and material agency, and how this effects change either on organizational routines or technology over time. The manner in which the imbrication takes place is determined by the perception by human agents of what is afforded (or constrained) by either existing organizational routines or technology. Although equal consideration is given to the affordances (or constraints) of organizational routines and technologies, Leonardi's framework and study focus on technology.

Although never making any specific references to organizational space, Leonardi's framework lends itself very easily to a study of organizational space using Gibson's

concept of affordance. Leonardi makes the point that it is the perception of affordances offered by technology that is of interest rather than any essential property since what is enacted as an affordance depends on the perception of the human agent. This is identical to Lefebvre's concept of perceived space as part of his theoretical triad.

In this framework, we define affordance as the range of possibilities or constraints on organizational practices resulting from the interaction between a situated actor and essential properties of ICT. Although this may seem to follow the determinism Fayard & Weeks try to address (2014), the taking into account of the situatedness of the organizational actor should ensure that social affordances (or constraints) are not negated. This therefore makes it possible to isolate affordances (or constraints) of ICT for the purpose of addressing the research question stated above.

#### ***2.4.2.2 Subphase 2.2: Looking at affordances of ICT for spatial practices***

In this subphase, for which theoretical development occurred in reality after the end of the data collection, the discovery of Fayard and Weeks' paper "Affordance for practices" (2014) was welcome since it provided the conceptual tools for addressing many of the weaknesses of the framework based on Leonardi's work on computer simulation technology for automotive design (2011). Leonardi's focus on routines instead of practices made the theoretical link between affordances of ICT and spatial practices tenuous. This presented many problems in subphase 2.1 since the substitution of spatial practices for routines wouldn't quite work ontologically. Although a practice can become routine – they are very different concepts and the literature confirms this. This is why Fayard & Weeks' focus on affordances for practice provided an appropriate conceptualization of the link between affordances and practices. Although the theoretical insights offered by Fayard and Weeks were not used for the collection of data, it was kept as a resource for the coding and analysis, should it be required.

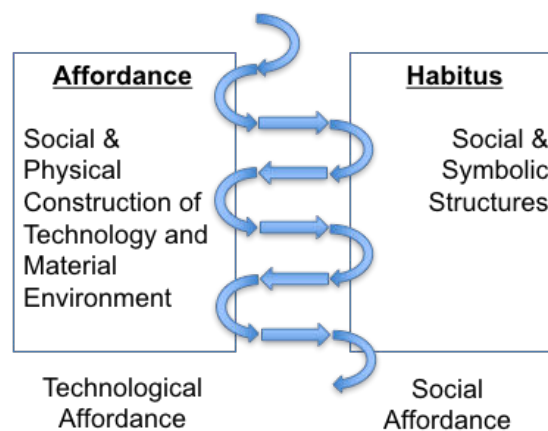
The result of the actor-environment interaction can result in constraining action just as easily as affording it. If we are to accept affordance rooted in essential properties of the environment, the same essential properties can lead to constraint. In the same way that Fayard & Weeks (2014) entangle the social and technological, constraint is dependent

on the social context as much as affordance. Although the explicit consideration of constraints as the other side of the same coin as affordances is limited to psychology (Riccio & Stoffregen, 1988), it is frequently presented as its pendant in more recent literature in Information Systems, Organizational Studies and Management (Majchrzak & Markus, 2012). Affordance and constraint are therefore conceptually the result of the same situated interaction between actor and environment. The concept of affordance can incorporate both possibilities and constraints at the same level. A critical drawback of this approach to ICT affordances and constraints within specific organizational contexts is that it can lead to myriad possible interpretations and the potentially endless process of identification of essential properties of technology with specific affordances or constraints for a given organizational context (Fayard & Weeks, 2014).

To address the aforementioned drawback to the most prevalent use of affordance in IS research, Fayard & Weeks propose in *Affordances for Practice* (2014) the taking into account of social and symbolic structures alongside technological and material affordances in order to avoid a deterministic approach. In their view, affordances are generated in practice by both the social and physical construction of technology along with the material environment. These sets of affordances are described as affordances for practice. In other words, affordances become only relevant in organizational contexts when they can be mobilized for specific practices such as communicating or collaborating. It becomes unnecessary to exhaustively research all the possible manners with which the affordances of a specific technological artefact could be interpreted and leveraged in an organization. Affordances are instead looked at through the practice lens and the starting point is a specific organizational practice. For example, should the practice in question be meetings, a projector will only be considered in terms of what it affords to the practice of meeting and not what it would afford a person wanting to watch films on their own. The same can be said of the material environment – in this case the chairs, tables and walls will be considered with a meeting in mind and not interviewing candidates for jobs for example. When considering affordances of technology, Fayard & Weeks note that it is just as much about the physical properties as the social conventions associated with an artefact. It is easily conceivable that it is socially acceptable for the meeting room projector to be only used for the projection of presentations or even films and not as a form of lighting or heating. This sort of use



would likely not enter the minds of those coming across the artefact given how it is socially constructed as a means to project images on a screen or a wall. In any case, the analysis should be bounded to a specific organizational practice, and in this instance a specific spatial practice which is a meeting. The authors augment their framework to include social and symbolic structures as social affordances by mobilizing Bourdieu's notion of habitus. These social affordances are reflected by what is considered to be socially acceptable in a particular situation, with a certain set of artefacts and a given group of individuals – in other words a specific organizational practice (Czarniawska, 2016). The social affordances associated with an executive board meeting will likely be divergent from the social affordances associated with a union meeting in a given organization. The habitus of board members and union members are not the same and result in a different set of social affordances for a given organizational practice. In combining material with social affordances, Fayard & Weeks propose a sociomaterial entanglement which produces a framework for the analysis of affordances for practice. This entanglement is represented in Figure 5 below.



**Figure 5 – Entanglement between social and technological affordances (Author)**

The framework in Figure 5 can be the basis of any practice-based study of affordances in an organization. The material and the social are clearly conceptualized and hence analytical codes and categories can be delineated for a specific practice under study. For example, for the practice of board meetings in a specific organization, one can collect data regarding the habitus of board members and note those affordances that are specific to board meetings (for example observe a number of board meetings conducted over a certain period). Technological and social affordances may get intertwined and

produce sociomaterial affordances which are associated to a specific situated organizational practice.

As the example of the organizational practice of meetings suggest, the spatial implications of ICT affordances are ever-present. Adapting the framework proposed by Fayard & Weeks (2014) for the study of the spatial dimensions of ICT affordances requires the analysis to focus on the spatial implications – anything having an impact on the bodies of individuals and their movement as part of an organizational practice. In the case of a meeting, do the technologies in practice facilitate standing or sitting? How are the affordances interpreted in practice? How does this vary according to habitus? What impact on the material environment?

To help understand the manner in which ICT affordances in practice help shape organizational practices and in turn be shaped themselves by these same practices, the riparian metaphor is borrowed from Dale & Burrell (2007). Habitus (social affordances) and technological affordances make-up an imaginary landscape where habitus can be the peaks and valleys, while the technological affordances are the downward slopes. The organizational practices are like the flowing water of rivers and follow the path of least resistance through the landscape of habitus and affordances. As the flows bed into the landscape, they stabilize and become part of the landscape itself. However, the flow of the river may at some point push on the affordance or habitus to yield to its force or adapt to a change in affordance or habitus and change the course of the water and hence modify the landscape. The push would correspond to the actions of individuals in changing the organizational practice (for example by insisting on standing meetings instead of sitting meetings) and changes in affordance or habitus can happen when new technologies are introduced or social change occurs in the organization (hiring of a new cohort of recruits for example). The riparian metaphor is powerful in that it can easily transpose what occurs in the natural landscape to the organizational setting – and to organizational space in particular. Just like flow of the river (practices) and the landscape (habitus and affordances) shape each other, organizational space changes over time. The riparian metaphor is represented in Figure 6 below.

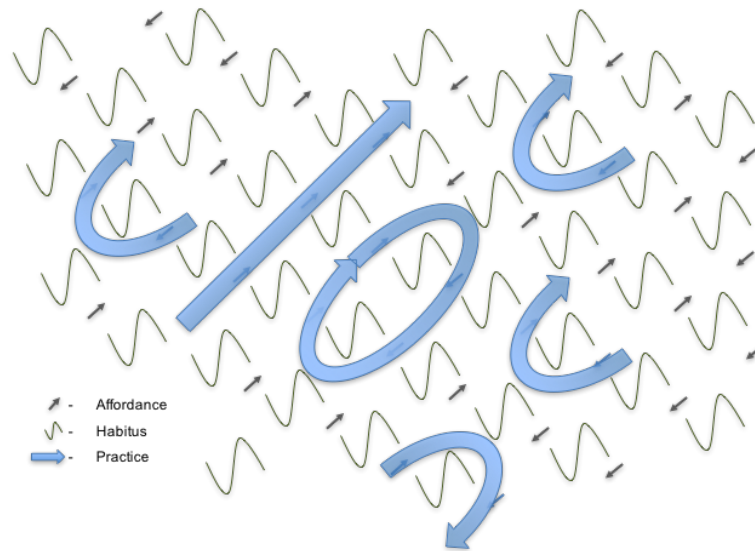


Figure 6 – Riparian metaphor for affordance, habitus and practice (Author)

The practice based approach to studying the mutually constitutive relationship between ICT and organizational space presented above is based on the reality of the dynamic nature of organizational life and at the same time avoids the determinism or voluntarism of more traditional approaches (for example using essentialist conceptions of technological affordances). Organizational practices are afforded by the sociomaterial dynamics of their context. Organizational space is part of these dynamics and is in turn shaped by the resulting practices. However when applying a framework such as Fayard & Weeks (2014) to the study of organizational space and ICT, it is difficult not to eventually fall into the trap of determinism since the affordances of technologies are conceptualized as perceived by individuals. In order to detect these perceptions, a researcher is obliged to either ask the individual how they perceive affordances or infer based in observation of others' actions and one's own experience in similar contexts. A more phenomenological approach based on Merleau-Ponty's body schema (1976) which would observe bodily interactions with ICT artefacts and organizational space would avoid the pitfalls of objectifying the artefacts or organizational space and falling into a material determinism based on the classic assumptions we are trying to avoid in the first place.

Although this framework was not used for data collection, it helped in the analysis of the data collected for the intensive phase. The insight into Merleau-Ponty would prove to be decisive.

### 3 Research Design

As with most research projects, this undertaking has been a journey on a long winding road with many steep hills, stalls, pauses and occasionally a U-turn. It hasn't followed a linear path that is often suggested by orthodox texts on research methodology where a literature review is performed, an interesting gap in the knowledge identified, a research question formulated, a case identified, design developed, data collected, analysis performed and eventually a document written up. In reality, this project started with some intuitions and was fuelled by curiosity, as explained in the introduction. This non-linear path has implications for research design and methodology for the study.

A research design is the overall strategy to logically and coherently pull together the various components of a study ensuring the research question is effectively addressed. It can be likened to a blueprint for the collection, measurement, and analysis of data (De Vaus & de Vaus, 2001). The logic and flow of the design follows Silverman's (2008) nomenclature for basic terms in research (Ch. 2). It will consist of the following three sections: Overall Research Model, Research Object(s), Methodology, and Case Description. A brief description of each phase of fieldwork is also described.

#### 3.1 Overall Research Model

As mentioned in the General Introduction, this study didn't start off with any set epistemological stance. Although theoretical inspiration was drawn from Marxist thinker Henri Lefebvre (1974), the study was never motivated by an interest in power relations or spatial emancipation. The reason for the choice in Lefebvre is simply due to his un-paralleled status as the space theorist of reference in the literature. This study was rather motivated by curiosity about the mystery of ICT and space, as we saw in the General Introduction, without an agenda other than discovery. This is reflected in the travelling narrative that I have chosen to adopt for this dissertation. The overall research model, therefore, is perhaps more easily described as grounded. It must be made clear that what is meant by grounded is not Grounded Theory (Glaser & Strauss, 1967), but rather a relatively neutral stance with regards to commitment to broad paradigms. Such a stance seemed to be a luxury at the beginning of this study, given the under-theorized nature of the relationship between organizational space and ICT. That

said, those paradigms, ontologies and epistemologies which I find unsuitable or inappropriate for this study are clear. A logical positivistic approach to the study of organizational space would only re-inforce its obscurity. Conceptualizing space as distance, as Taylor & Spicer show most of the literature doing (2007), would disqualify any other insight such as experience as invalid or subjective. It is this very experience of space, as Lefebvre reminds us, that pushes us to move in a certain manner. Physical space will be important in shaping this movement, however, not necessarily the most important. Taylor & Spicer's literature review show us that experience is considered to be central for the study of organizational space. However, given the literature review in this study hasn't yielded a corpus of research on the relationship between ICT and organizational space, I have chosen not to align methodological orientations to any dominant paradigm in the organizational space literature. This will mean that choices will be made solely based on the research problem at hand and the objects of research. We will now define the objects of research and review the methodological choices.

### 3.2 Research Object(s)

Both research questions emerging from the theoretical journey of the previous section have two identifiable objects – ICT and spatial practices. We can consider organizations as the context of spatial practices. We need to define more fully these two research objects to inform our methodological choices.

In this research project, it was decided early on to not focus on a single technological artefact since academic research is undertaken in diverse contexts and with different combinations of devices and software. To have focused on a single artefact would not only have had a limiting effect on inferences, but would have been risky since, with perhaps the only exception being Microsoft Word, there are few standardized or universal tools adopted by researchers to undertake their work. Academics in Management or Organization Studies are often autonomous in selecting their tools of work and very often adhere to the BYOD principle where they improvise using their own personal devices and software. On the contrary, keeping a broad scope in terms of technology gives room for discovery of how researchers improvise or resort to a form of *bricolage* to optimize their workaday. ICT will therefore broadly refer to the set of tools used in the context of practice as they emerge from the data. We may eventually choose

to focus on one artefact should it become evident that such a focus would benefit the study. As seen from the works of others (Weir, 2010) it is better to engage in some grounded preliminary fieldwork before committing to a specific research object.

Considering we will be using Gibsonian affordance, it would be inappropriate to focus on a single ICT artefact. This is due to the notion's principle that affordances cannot be narrowed down to a single part of the environment. ICTs are part of the physical environment, and it is the environment as a whole that affords and not each component part affording in isolation.

We will define spatial practices according to Lefebvre – a practice seen through a spatial lens. Practices can be defined as the recurrent actions of individuals (Schatzki, Knorr-Cetina, & Savigny, 2001). In studying practices in organizations, we focus on the daily activities animating organizational life in terms of routines and improvisation, and seek to understand how they are generated and sustained over time (Feldman & Orlikowski, 2011). Within such a perspective, spatial practices are just practices seen through the lens of the daily movements of individuals in space. Routines can be examined for patterns of movement in both space and time, the changes that occur in them, and how individuals react to unexpected events. A spatial practice can be sitting at a desk for certain hours of the day, taking the bus to commute to work, or meeting colleagues at the coffee machine.

Since our case study is looking at the academic environment, and business schools in particular, we can define some spatial practices that are familiar to most. Conducting lectures in an auditorium or a class in a room are spatial practices. The practice of the common table (breaking bread with fellows in your college) in Oxford or Cambridge Universities is a spatial practice. As a researcher myself, I can think of other practices, such as reading journal articles or writing papers. All of these practices involve certain movements and spatial dispositions. Sitting at a computer in a relatively calm environment, standing in front of a group of students facing you, or sharing a table at a certain hour for lunch.

Research collaboration was the choice for research object at the beginning of the intensive phase of the study. It was thought that this would allow a maximum of generalizability of the findings from the academic world to the world of business. However, it was realized from coding that this was too limiting and was quickly abandoned in favour of letting the relevant and most data-rich practices emerge. Like ICT, I decided not to focus on one specific practice for academics in business schools. The data was coded by spatial practice as they emerged. The practices which eventually emerged would be looked at individually in terms of generalizability.

### 3.3 Methodology

The research questions that emerge from the theoretical journey described in the previous section are best suited for a qualitative approach since the aim is to unpack the manner in which spatial practices are deployed in a specific setting – the research setting in business schools in this instance. Contextual sensitivity (Benbasat et al., 1987; Silverman & Marvasti, 2008) can only be ensured with a qualitative method since a quantitative approach would require a certain level of abstraction that would numb the researcher to the locale of the phenomenon as it unfolds. This is especially important given the research question is located in an under-theorized part of the literature.

This research project uses a multiple case-study strategy following Silverman (2005), Yin (2008) and Benbasat et al. (1987). In line with the earlier affirmation regarding a qualitative approach, Benbasat et al. argue that a case study strategy is well suited for problems in the very early stages of theoretical development and especially those dealing with situated action that can only be studied in context (1987). They further argue that investigations of the rapidly evolving area of information systems in organizations make them particularly good candidates for the case strategy.

Benbasat et al. present a case study as examining "a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organizations). The boundaries of the phenomenon are not clearly evident at the outset of research and no experimental control or manipulation is used." (1987: 370). This research project has as its objective hypothesis generation in following the traditional phases of knowledge accrual (Benbasat et al., 1987) and would

be considered as exploratory according to Yin's framework (2008). In short, the aim is to first discover and describe the phenomenon of research in business schools and then to proceed in exploring the process that shapes the organizational space. In pursuing this aim, the most suitable unit of analysis will be determined by the research question. In this case it points either to a specific technology or a specific research practice. It would be more appropriate to study a specific research practice since researchers employ myriad technologies to support their work. Focusing on one would unnecessarily limit the scope of the investigation and fragment it across several practices. Focusing on a specific practice is also coherent with the chosen theoretical framework that is centered on a practice view of the organization.

Given the fact that the phenomenon under study is not yet very well understood, a multiple case study strategy is appropriate (Benbasat et al., 1987; Silverman & Marvasti, 2008; Yin, 2008). The selection of cases will be based on a literal replication logic (Yin, 2008) and ease of access. Literal replication is the result of a multiple case study where similar results are expected. This is in opposition to theoretical replication where contradictory results are expected. With the current level of knowledge of the phenomenon being investigated, it is very challenging to assess beforehand the likelihood of contradictory results. The variety of institutions and research practices in the academic world combined with the complexity of a poorly understood phenomenon make the prediction of results a risky act of speculation. However, a combination of factors characterizing the world of research in the business and management domains would suggest that a literal replication logic would be better suited. These would be the broad diffusion of information and communication technologies (whether they be provided by the organization or personally sourced), internationalization, increasing levels of collaboration, increased competition and a homogenization of research standards across the globe. All of these factors could be partly explained by a well-documented trend of organizational isomorphism (DiMaggio & Powell, 1983) in the higher education sector around the world (Christensen & Eyring, 2011). Such a characterization of the contemporary world of research would suggest that results for several cases – or institutions – would be similar. However, the set of selected cases must be reasonably representative and any significant divergences in characteristics likely to impact the results need to be explicitly identified. Given the internationalization



of research, it would be appropriate to select cases from different national contexts. These national contexts will likely represent the biggest source of divergences in the results and therefore need to be well identified in the case descriptions. This exercise is essential for the undertaking of the cross-case analysis.

Fieldwork is also conditioned by access to organizations and this is a key part in the selection of cases for this investigation. Access to three suitable higher education institutions in three countries was secured opportunistically with the help of established contacts. Much of the selection was based on other practical concerns such as funding of fieldwork abroad, difficulty of undertaking research in certain countries (visa restrictions for example), availability of interviewees, and language. Only two sites were retained in the end due to budgetary constraints. Details for each site can be found in the case descriptions section.

Time in the field would follow an ethnographic approach. Each trip to the sites would involve spending as much as possible on-site. This would be to do direct observation, but also take photographs and interact with people spontaneously. Being familiar with the academic environment, this was natural for me.

In selecting methods for this multiple-case study, we will apply Yin's four tests for judging the quality of case studies: construct validity, internal validity, external validity, and reliability (2008). For each of the following choices, these criteria will be used as basis for their justification.

Data collection methods will be varied and include documentation, archival records, interviews, direct observation and physical artefacts (Benbasat et al., 1987; Yin, 2008). The interview protocol may be found in Appendix 9.1. The use of multiple sources of evidence is important for construct validity in case study research (Yin, 2008). Converging lines of inquiry limits the likely bias of a limited set of data sources and allows for triangulation that lends support to conclusions of findings (Yin, 2008). Furthermore, it prevents the over-reliance on manufactured data that is often the result of open-ended interviews (Silverman, 2017).

As mentioned in the previous section, we followed a phased approach to research identical to the one Benbasat et al. (1987) recommend. Fieldwork was divided into exploratory and intensive phases (See Fieldwork Phase Timeline in Appendix 9.3). The exploratory phase consisted of getting familiar with the research environment in the case institutions, leading to a descriptive account of the phenomenon under study. This resulted in adjustments to the overall research design – especially the case study protocol.

Being an academic-in-training myself, the risk of bias and identification with my interviewees was always present. For this I maintained a certain level of reflexivity in my interactions with them. This was especially important for those interviewees with whom I had a previous relationship with. Given the fact that spatial practices are part of the objects of study, it was also important to experience space like the academics in the case institutions by walking through the same hallways and pushing the same doors as them.

All data was processed through the NVivo software in order to assist with the coding and analysis. Analysis was mainly performed by pattern matching and performing queries to seek strong links between categories. This is one tactic identified by Yin for ensuring internal validity.

Being a multiple case study, the likelihood of the findings being generalizable are increased compared to a single-case study. This addresses Yin's criteria of external validity. Furthermore, in performing a cross-case analysis, we further enhance the potential depth of the findings (Miles & Huberman, 1994).

All interviews were recorded and transcribed either by myself or professionally. This was necessary for processing the data in NVivo. Photographs, archives, observation notes were all also processed with NVivo. Although no separate case-study protocol has been produced, all significant decisions regarding coding are recorded in the Findings section and queries performed on NVivo have been recorded along with their results. All of these elements are retrievable and can constitute a case-study protocol along with the

interview guide. Although not necessarily the objective of an exploratory study such as this one, it would address Yin's criteria of reliability.

### **3.4 Case Descriptions**

For each case, we will present a brief description with elements which may be particularly relevant for the cross-case analysis. We mainly focus on the spatial characteristics of each case (architecture, number of faculty, urban context, etc.).

#### **3.4.1 Desautels Faculty of Management – McGill University**

McGill University is located in the center of downtown Montreal and the institution is deeply embedded in the urban fabric of the city. McGill was founded in 1821 and the site occupies a hill overlooking the heart of the commercial and business district. It is located on Sherbrooke Street, which runs almost the entire length of the island of Montreal. Sherbrooke Street was, at the foundation of the university the main axis for the hub for the city's elite. This hub, also known as The Golden Square Mile, is a small area where wealthy merchants and bankers – mostly Scottish settlers – used to live at the time Montreal was a major commercial and banking center. McGill university was an integral part of this ecosystem, and as the name of the founder indicates, very much connected to the Scottish origins of the most influential Montrealers of the time. Much of the urban development of the city since the foundation of the university has been done with the site of the university as the centerpiece. The perspective from the plaza of Place Ville Marie (see Figure 7), the first skyscraper built in Montreal with a unique cross-like design, shows the wide McGill College Avenue providing a clear view towards the historic center of the McGill University campus represented by the dome-topped building (slightly obstructed by trees). The campus seems to dominate the commercial center of the city, which is where many graduates – especially from the Desautels Faculty of Management – end up working. This proximity to the business community is the continuation of a long history of close relationship between the university and the business elite of the city.



Figure 7 – Perspective of McGill campus from Place Ville Marie (Author)

The Desautels Faculty of Management was originally founded as the Department of Commerce within the Faculty of Arts of McGill University. It is located in the Samuel Bronfman building since 1972 (see Figure 8). This building is directly situated on Sherbrooke Street and it occupies a somewhat separate space from the rest of the campus in that it looks like any office building in downtown Montreal. The location of the building makes it directly accessible from the main thoroughfare and is in constant contact with the movement of the downtown core.

The Desautels Faculty of Management had in 2016 a total of 2,540 students registered, including 64 PhD students. 100 professors work at the faculty<sup>3</sup>. The building has undergone several renovations recently and space constraints are prompting the faculty to expand into adjacent buildings.



**Figure 8 – The Bronfman Building, Sherbrooke Street, Montreal (Canada) (Author)**

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<sup>3</sup> These figures were retrieved on the 6<sup>th</sup> of May 2017 from McGill’s institutional website: <http://www.mcgill.ca/desautels/about/quick-facts>

### 3.4.2 Judge Business School – Cambridge University

The Judge Business School, located in Cambridge, England, was founded in 1990 initially as the Judge Institute of Management Studies. The school is located in the refurbished old Addenbrooke's Hospital, first built in 1766 (see Figure 9), facing the prestigious Fitzwilliam museum. It was inaugurated in 1995 and is an original instance of architecture, both outside and inside (see Figure 10).



Figure 9 – The Judge Business School, Cambridge, UK<sup>4</sup> (JBS Institutional Website)

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<sup>4</sup> Photo retrieved on the 6th of May 2017 from the Judge Business School's institutional website



Figure 10 – View of the JBS atrium from the 3<sup>rd</sup> floor (Author)

The JBS has 55 faculty members and approximately 420 registered students<sup>5</sup>. There are approximately 40 PhD students currently at the JBS.

### 3.4.3 Descriptive Comparison

Both institutions are located in the historic heart of urban centres, with Montreal being significantly larger than Cambridge. However, in comparison, Cambridge and its vicinity are very densely populated and has been experiencing a large increase in population over the past few years. Both institutions are also experiencing significant space constraint issues with the increase in number of students and executive training courses. Both have embarked on site expansion projects involving extensions onto adjacent sites. This comparison will be more detailed in the cross-case analysis.

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<sup>5</sup> Figures retrieved on the 6<sup>th</sup> of May 2017 from the JBS institutional website

## 4 Findings

The identity of the interviewees has been anonymized in the text. You may find the description for each interviewee and details on the interviews in Appendices 9.4 to 9.7.

### 4.1 Phase 1: Exploration

A research question was formulated only in subphase 1.2. Subphase 1.1 dealt with the broader relationship between information and communication technologies and organizational space with a focus on how technologies affected the daily work practices of those working in business schools. No single community or activity was targeted initially and hence we have a variety of interviewee types such as students, facilities managers, and professors in the two different case institutions. It should be noted that two interviews from this phase were at my home institution of Université Paris-Dauphine. These interviews were with the e-learning and digital transformation managers. Although these interviews were not at the two cases selected for this study, they would be useful for understanding the broader context of business education. The objective of this phase was to develop the research question and narrow the focus of the study on specific technologies and/or activities (this objective was quickly abandoned).

#### 4.1.1 Subphase 1.1: Discovering what space means for different actors in the business school environment

Two interviews out of six in subphase 1.1 of the fieldwork were done with members of the home university of the researcher – Université Paris-Dauphine. The four others were done with members of McGill University – a student, a member of faculty, a staff member and a professional consultant working for the Desautels Faculty of Management.

Being the first contact with the field and not having much in terms of theoretical grounding or a very targeted research question, this subphase of data collection provided a very disparate set of data regarding the organizational spaces of business schools. The interviews were very open ended with the only guide being the very broad question about the relationship between space and technology.



#### *4.1.1.1 Summary of Data*

What emerges from these conversations is a picture of the business school environment as being in a state of flux and under tremendous pressure from both students and competition to modernize their facilities. The administrative coordinator (now retired) for the Desautels Faculty of Management of McGill University very strongly indicated the organization was close to breaking point in terms of space and was looking to other Canadian universities for inspiration on how to handle the process of modernization and expansion. This was clearly echoed by the Facilities Management Consultant hired by the Faculty to help in dealing with the pressure. Renovation of the fifth floor of the Bronfman building was under way during the interviews, and much of the discussion was on how this was planned and managed. The use of other business schools in North America as models of excellence was brought up on several occasions. Therefore, a theme of envy was evident early on in the investigation.

More specifically regarding technology, Dauphine University's leader of digital transformation spoke at length about the pressures on the higher education sector to not only modernize facilities, but transform the pedagogical model to adapt to new technologies such as MOOCS and also new ways of learning such as FabLabs and e-learning platforms in universities. He was extremely worried about the upheaval such transformations would produce for both professors and students. Flexibility of teaching spaces along with common spaces such as libraries and student lounges will become increasingly important. Having robust Wi-Fi connectivity becomes a key factor in successful pedagogical practices.

The first of two interviews with a 2<sup>nd</sup>-year Industrial Relations student (undergraduate) at McGill University and the conversation with the co-director of IT Learning Services at Dauphine University described how innovative approaches to teaching are being taken up by professors thanks to new technologies they have put in place. These approaches are flip-the-classroom (watching lectures at home and doing exercises in class), blended learning (mixing distance learning with on-site teaching), podcasting courses and virtual office hours. Adding to the theme of envy, the 2<sup>nd</sup>-year Industrial Relations student was specifically impressed by the technology made available in the Bronfman building at McGill University housing the Desautels Faculty of Management.

#### **4.1.1.2 Analysis**

This subphase based on six very disparate interviews in terms of roles and geographical location provided a broad contextual picture of the international business school environment. We see that two different institutions in Canada and France are exposed to similar pressures and are responding in similar ways. Much of the focus is on providing students with the best services and investment and resources are mostly directed towards this. Improving classrooms, providing more common spaces and adopting the use of the latest technologies are all actions both institutions are actively engaged in. Other activities that are at the core of business schools is research and this has not emerged as a critical dimension in terms of organizational space, which is surprising given how important research is for these institutions. For this reason, it was decided to interview PhD students opportunistically. This is what will be investigated in the next subphase – the spatial practices of researchers in business schools.

#### **4.1.2 Subphase 1.2: Understanding spatial practices in the context of a business school**

At this stage of the study, the theoretical framework was still not well defined (as mentioned previously), however major theoretical concepts regarding organizational space from Lefebvre (1974) and from the information systems (Orlikowski, 2000, 2010) field were available to offer insights and structure the inquiry process. In this subphase, more focus is on the practices of those producing research in business schools, so PhD students were approached as a first step since they were the most accessible (I had previous contact with the PhD students at the Desautels Faculty of Management). All of the interviews in this subphase were conducted at the McGill University site in Montreal.

##### **4.1.2.1 Coding**

Before formally coding, some striking aspects from the interviews of this phase show how important the embodied experience is for interviewees. Almost all the senses are involved in the way the interviewees recount their daily experiences in the research setting: smelly, dark and dingy offices (interview #13 with an external PhD student), noise (interviews #10, #14 and #15 with PhD students in Management), the weight of paper and laptops (interviews #10 and #15 with PhD students in Management) and fresh air (interview #12 with an external PhD student). The reason why this is

important is that all of these sensual solicitations contribute strongly to the shaping of the perception of the organizational space. Each of these points deserve to be looked at in more detail.

#### 4.1.2.1.1 Smelly, dark and dingy offices

Interviewee #13 is a first-year PhD student in Sociology at McGill University. Although she isn't a student at Desautels, through her husband who is, she managed to get a shared office space in one of the PhD rooms. She was driven to abandon her original workspace in one of the Sociology buildings because it was "... smelly, in the basement. It smells like a cheese factory ... it's very dark because it's in the basement. Very, very dark".

#### 4.1.2.1.2 Noise

Silence to enable concentration was very important for some (interviewee #14), for others it was noise (interviewee #15) and in some cases, it depended on the task at hand (interviewee #10) where noise would be sought after (working in cafés for example) or avoided (reading long texts at home).

#### 4.1.2.1.3 Weight of paper and laptops

The weight of paper is implicitly referred to (interview #10) when referring to the inconvenience of carrying it from one workspace to another (mainly between the home and office) and in one case (interview #10) one of the reasons for going 'paperless'. Similarly, the weight of laptops is implied when referring to the organization of IT equipment across workspaces (interview #10) where preference is given to the setting up of fixed desktops with synchronization at each locale and using just a smartphone when on the move. Laptops are also referred to explicitly (interview #15) as an inconvenience for mobility.

I myself found the embodied experience to be of importance while moving about the two case sites. In the Bronfman building, I would find some of the doors of the 5<sup>th</sup> floor (where the PhD students are located) very heavy to open, so I eventually developed the habit of taking certain routes to get around the floor to avoid certain doors.

The fact that the embodied experience is important for the interviewees is important given that this is exactly what Lefebvre meant by the body being the basis of the production of space. We see that what he calls the 'texture' (1991) of space is the juxtaposition of sensual stimuli and the possibilities of bodily movement.

In some instances, (interviewee #10 and interviewee #13), the physical theft of laptops was determinant in deciding on how to organize their work spatially. Interviewee #13: "So I'm not sure if I'm going to the bathroom, if I can leave all of my stuff here totally safe" (...) "... you have to go to the bathroom with your computer". So while laptops were providing a certain form of mobility to the interviewees, they were also restricted by not only the cumbersomeness of the objects, but by their vulnerability to physical theft. Smaller devices such as smartphones were considered (interview #10) to be more practical for mobile work, albeit for a limited set of tasks.

During the interviewing, it was revealed that two of the interviewees were 'squatting' office space (interviewee #13 and interviewee #12). This is to say that they were not allocated the space they were occupying and were present with the informal and implicit permission of other members of the community. This meant that the legitimacy of their presence was constantly being questioned (interviewee #12: "... I should not have an office with this small connection. (laughter)", referring to her contact with a professor at Desautels). Interviewee #12 found ways to 'stay off the radar' and remain discrete by using social media and mobile technology. She would for example use these technologies to avoid the embarrassment of going to the graduate student lounge and being unable to enter because nobody would be present to open it for her. She would therefore check on social media or send a text message to the others who had access to ensure they were present in the lounge before leaving the office. She would also use technology to avoid being visible in the hallways and exposing herself to the risk of being confronted on her presence. Instead of popping out to see other students in offices on the same floor, she would rely on social media and SMS. Social media would also be a way to take a break and avoid having to leave the desk and be made visible outside the office. Otherwise some breaks outside the office would be taken outdoors to get some 'fresh air'.

#### 4.1.2.1.4 Paradoxes

Interviewee #15 says "... I think a PhD student is kind of a strange animal in the sense that we really don't need much. We don't really need a lot of space. We don't need big offices. As long as we have the hardware we need and the printer for printing the papers, I think we are pretty OK." What is paradoxical in this verbatim is that the PhD student doesn't seem to think that much is required in terms of space, however he makes the point during the interview that he needed a big screen, a place to take a break, a noisy environment to stay motivated, printers (to print papers that would eventually take up a lot of space) and yet says "... we really don't need much". Is this PhD student judging 'much' relative to what a he believes a professor or a lecturer would need or is it because all of the other spatial aspects he attributed importance to are after all not very important or perhaps he doesn't think about what printing, taking a break or being in a noisy environment demand in terms of organizational space?

Undergraduate and graduate students alike go to work somewhere in what they consider to be favorable working conditions to be around others and yet they look for silence and isolation using social media (interviewee #8, interviewee #12, interviewee #15 and interviewee #10). Is there a tension here interesting to investigate in terms of organizational space?

One PhD student seemed to be torn between the temptation of technological distractions (app notifications) and social distractions (bumping into people) (interviewee #10). This could be another interesting tension to investigate – what difference does this make for the shaping of organizational space?

#### 4.1.2.1.5 Other interesting points noticed in the interview transcripts

For the undergraduate student (interviewee #8) and the two external PhD students (interviewees #12 and #13), business schools and management faculties were considered to be excellent work environments, especially from the point of view of students working in other faculties such as Sociology (interviewee #13). This is perceived to be down to a question of funding. Also, having a reliable phone signal is important at all times as is remarked by interviewee #12 when she was originally

assigned an office in the basement at her home institution where mobile reception was very difficult. The same interviewee also remarked that she found the fact that she didn't have an access card (as a squatter from another institution) prevented her from accessing certain areas of her work environment such as the kitchen or lounge. These physical barriers along with the non-possession of a card made her feel slightly unwelcome and limited her movements not only to those areas she didn't have card access to, but also to common areas where no controls were in place. Many interviewees mentioned the separation between work and personal environments, with some specifically mentioning how they use technology to enact this separation – what is the structuring role of ICT and does it generate the need to separate even more or act as just a tool to enhance existing separation?

Systematic open coding of the transcripts of interviews from the exploratory phase using Nvivo yielded 27 categories of topics, which in the end were grouped in the following high-level categories: Distractions, Envy, Minimal requirements for PhD students, Other research (categories kept for future projects), Sociality, Territoriality, The body, and Using technology every day. Unfortunately, the version of Nvivo run on Mac doesn't allow for the production of reports, and therefore a screenshot of the categories (or Nvivo nodes) is presented in Figure 11 on the following page.



Figure 11 – NVivo nodes for Exploratory Phase (Author)

Although there is a separate category ‘Using technology everyday’, many of the other categories can be put into relation with this category specific to technology. It is this relationship between technology and spatial practices that we are trying to unpack at this stage. Before looking at this relationship specifically, it will be interesting to understand how the topics emerged in the first place during open coding. All of the topics listed appeared to be recurring and of importance.

#### 4.1.2.1.6 Distractions

Interviewees #8, #9, #10 and #14 made specific reference to how they manage distractions and temptations to procrastinate when they are supposed to be working. Interviewee #8 (a 3rd-year Industrial Relations student at McGill) made specific reference to how he manages technology-based distractions by either putting his phone

as out-of-sight as possible, “I put it in my backpack all the way at the bottom on silent, unless I’m having... like on Saturdays and Sundays I usually keep it in my pocket if I’m at the library, because I feel like I deserve to have a little bit of social communication if I’m at the library on the weekend”, shutting down Internet connectivity completely on other devices, “I don’t connect when I go to Second Cup intentionally, because then if I do take out my laptop or my iPad, then I don’t have access to Facebook, social media, messages, all that stuff” or “(...) sometimes I shut down my Wi-Fi when I’m in the library to try and disconnect for a second and not let anything ping me”. Interviewee #10 (a PhD student in Management) expressed his frustration at technology not being designed “(...) at letting you compartmentalize your time and your resources in general (...) I think it is very invasive”. Interviewee #9 (a 3rd-year PhD student in Management) suggests that efforts by organizations to block access to social networking sites are counterproductive since users end up spending more time trying to circumvent these restrictions. Interviewee #14 (a PhD student in Management) even suggested that he might as well turn off his laptop altogether to avoid emails and notifications. This theme of the battle against technology-based distraction is recurrent with the interesting paradox of the need for distraction (to the point of making efforts to maintain access to these) and the constant battle against them. The interviewees felt that having the freedom to decide when they get distracted was important, yet at the same time felt frustrated by the effort required to manage this aspect of their daily routines.

Interviewee #8 made an interesting observation regarding non-technological distractions in the library: “(...) and I always face this direction because the flow of people comes down the middle. So if you’re facing this way in my peripheral I see people coming in, distraction. I like seeing the most steady area of the library as possible so that it again reminds me that everyone’s here working, not the people who are popping in and popping out”. This suggests that corporality plays an important part in the shaping of organizational space. The nature of the human body, its geometry and constitution determines how we orient ourselves in space and how we perceive this space as well. This is something Lefebvre discusses at length in “The Production of Space” (1991). It would be interesting to see how this role of corporality in the shaping of space is influenced by ICT.



Interviewee #9 abandons technology altogether in order to be distraction-free for certain tasks:

So I can't read on my laptop, and I... And in retrospect, I think it was a good thing. It's been a year already I've been... So I can only work like writing if I'm here or at home, but yes. Very... I don't know, if I want to work somewhere else, then getting rid of distractions and getting rid of... I will take a notebook and I'll write. And at least ideas, and maybe some paragraphs. And then I'll bring that to a computer later and type it in. It's better than... Yes. It's simple. There's more simple way. So yes.

And this is a strategy which seems to be shared:

The first and foremost problem that I've had with going virtual is that I was half paperless and half with paper. It took me a very long time to get rid of the paper because it wasn't possible to stay only with paper, but going paperless also wasn't possible. Like, reading and commentating a text is obviously done on paper. Most of the longer readings are better on paper since most of the devices we use are multitask. They just make you too jittery. All the time, you're going back and forth between two applications instead of reading what you have to read. Now it's been more than two years that I tried to be all paperless. I don't say that it was easy. That was my main virtual vs. real world dilemma that I had, and I have it still. (interviewee #10)

Although this declaration by interviewee #10 seems to contradict the rest of his story where he describes how he has been working on going completely paperless with his work and how this has been a complete success.

#### 4.1.2.1.7 Envy

The sense that business schools are better equipped and have better facilities was quite strong amongst the interviewees. Being married to interviewee #9, interviewee #13 (a 1<sup>st</sup> year PhD student in Sociology) believed that she would get a desk and an office like her husband when starting her thesis in Sociology but ended up having to share a basement office that smelled like a "cheese factory". This drove her to squat her husband's office in the Bronfman building in order to escape what she considered to be difficult conditions in her home department of Sociology. Referring to her home department, she says "It's really one of the poor parts of Social Science. You have to deal with it". However, she says that she has reservations about the amount of private funding and elevated tuition fees at business schools which "(...) I don't find it great" and

“You sell kind of your soul”. Interviewee #8 felt that the Bronfman building had a special status as part of McGill University:

Q: Do you consider it on campus by the way? That’s one of the questions I asked.

A: Yes, I consider Bronfman on campus.

Q: Okay, alright

A: It’s hardly on campus, though. It could easily be something that seems like it’s not part of McGill campus, but I would still consider it part of McGill campus.

He goes on to mention wine and cheese receptions and a special attire that generates a certain “vibe” which doesn’t exist elsewhere on campus. He also mentions how students from all of the other faculties (other than Management) would never have any business going to the Bronfman building which adds to the sense that the building is not on the campus and is a separate entity.

Regarding ICT specifically, interviewee #13 wishes that the Sociology department would provide fixed workstations to PhD students like the Desautels Faculty of Management since “It changes a lot (...) I’ll go to the bathroom thinking I can leave it, and can leave it at night. I have no problem. So for me, I think this is great about business school. They provide computers”.

Even more interestingly, some felt that other business schools (other than the McGill Desautels Faculty of Management) were better equipped and had better facilities. The married couple of PhD students (interviewees #9 and #13) were very impressed with the facilities at HEC Montréal and interviewee #9 refers to a certain “vibe” in the building (located in another part of the city) and feels like the PhD students based in that building can benefit from having a good variety of work spaces – closed offices and very cavernous common spaces on the ground floor (in part corroborated by the interviewer). Having a large space is important. Interviewee #13 reiterates her reservations about the feeling that one needs to ‘sell their soul’ in order to get access to such facilities in business schools and that this trade-off doesn’t exist in Sociology where one can maintain their intellectual independence.

#### 4.1.2.1.8 Sociality

All of the interviewees naturally had something to say regarding how their day-to-day interactions with others would affect how they experienced space. Interestingly, the two most recurring topics under the header of Sociality is “Avoiding others” and “Pushing each other into a work mood”. We see a parallel with the earlier theme of the tension between concentration and distraction – here we see a clear tension between desiring being relatively isolated and being in the company of others. Interviewees #12 and #13 are PhD students from other faculties and therefore have perhaps a more compelling reason to avoid others in the Bronfman building. Their use of ICT, however, for this challenge is interesting. For example, interviewee #12 likes to use social media to make sure she will not be roaming the hallways on her own too often or needlessly get out of the office to look for someone she would like to take a break with. Contact with others – a risk she feels given her ‘outsider’ status – can be reduced by using social media. Not having a badge allowing her to access certain common areas of the building, such as the PhD lounge, she ensures that when she heads there for a lunch break for example, she would be sure that someone would be there to open the door for her. The fact that she doesn’t have a badge – and therefore ‘illegitimate’ remains concealed that way. It appears that certain technology-based barriers (badge-controlled access) are circumvented – along with the associated social stigma (by being refused entry) by using other technology-based tools such as social media. The interviewee’s movements seem to be modified by both technologies, but how does this happen?

ICT seems to add the issue of trust when sharing spaces. Interviewee #13 mentioned one of the reasons for relocating to the Bronfman was the feeling that she was amongst people she could trust leaving her laptop or smartphone with when going away momentarily to go to the bathroom for example. Otherwise she would feel compelled to take the laptop with her (she experienced theft in another shared environment), which represented a certain hindrance in terms of mobility. This links well with other remarks about how bulkier mobile devices such as laptops can represent not only a physical burden in terms of weight, but also a hindrance to movement due to the high risk of theft in and around the campus.

The tension between concentration and distraction is well represented by interviewee #13 who says she likes to be alone in the office (shared with 3 other PhD students) but with the door slightly open so that she can see and hear what happens in the hallway, "(...) so the fact that there's movement, it helps". This contrasts somewhat with interviewee #15 who, as mentioned earlier, says that total silence distracts him and that he prefers to work in a noisy environment with many others present. He attributes this to his experience in his home country, Italy (which he characterizes as a 'loud' country), and especially that he got used to working in large study rooms where many students would work at the same time, "Being alone with myself really distracts me. I cannot concentrate. If I focus too much on something, I can't concentrate. It's like my mind takes over and I go off thinking about whatever else". This is in complete contrast with the experience of interviewee #14 (PhD student in Management) "(...) who is like really sensitive to noise and distractions. Like I'm the person who would, you know, comment to people who were talking too loud in the library. So it really doesn't. It never works for me". This PhD student prefers to not be with others to work individually and is quite sensitive to noise.

The 'Pushing each other into a work mode' is the other side of the coin to 'Avoiding others' because many of the remarks regarding working in the presence of others are spoken in the same breath as the feeling that being in the presence of others pushes them to work more diligently and keeps them from procrastinating (almost the same codes appear under these two categories). Interviewee #9 says "But I like coming in because of... You have... I mean, you talk to people who are doing the same thing, you can push each other to be in this work mood, and to be productive" and "being around people who are maybe doing the... Going through similar things" and "If you're here, just by showing up, you're putting yourself in mode of work, and I don't know. If... Nobody will say a thing, but maybe you change your behavior because there is somebody watching, and there are people going, and you don't want to... I mean, you don't want to goof around the whole day". These sentiments are echoed by interviewee #8 who says "(...) just having other people around me that are taking school really serious at that moment, it kind of inspires me. It reminds me that it's not just that I have to finish this. It's like I have to compete with people essentially at times to make sure that I'm doing the best I can and keep it as like a mental like you need to do this and a reminder". The

motivations of a PhD student and an undergraduate student are likely to differ (the undergraduate student is perhaps more motivated by the competitive aspect of studies with examinations and grading), and this perhaps explains why the two characterize the presence of others differently – for the PhD student, it is about sharing an experience and a ‘mood’ as well as appearing to be a serious worker, whereas for the undergraduate student, the pressure of seeing other students – some of which would be taking the same classes – is about relative performance and social acceptability as well.

Interviewee #9 characterizes the PhD student as a ‘social animal’ (hence the label for this category). Regarding the research process, he says, “So this is actually a very social process. It’s not an inside, and put me in a cave, and I will come out with the best paper. It’s... You need to test something, and sometimes you think about something for a while, and just as it comes out of your mouth, that you explain to someone, looks very stupid, and then you say, why was I thinking about it that time? That much?”. He goes on to complain about the lack of a faculty room for new faculty to socialize with their new colleagues and that the PhD lounge is not used appropriately as a social space.

#### 4.1.2.1.9 Territoriality

A sense of territory and mobility were strong in the interviewees responses. The most recurring theme was ‘Separation’ – separation between home and office spaces, between professors and PhD students, between the city and the campus grounds. The most important separation is between office and home environments with many expressing a strong desire for this division. For interviewee #10, work can be performed both in the office and at home depending on the task at hand

I find that, both for creative work and analytic work, like a lot of concentration and a lot of creativity. For both I need calm. Reading, for me, depends on what I read, but if I read an article that is important and I want to integrate it in my system of thinking, then I really think I need the calm at home. It doesn't work for me anywhere else. You have to imagine that during the day I have a lot of sun there and it's just really calm. There's no noise. It's really bright. I feel good as well. It's not only that it's home. It's also that setting. So that helps me a lot. When I want to be creative, it should be at night. Even for my photos, I do it at night. I don't know why. It's just like (.) I guess I'm more schizophrenic at night. I make the relations better – the unrelated relations. I find them better at night. For both, I need a lot of calm. I make a lot of harmony out of it.

However, for the others, home was non-conducive to work. Interviewees #8, #13 and #14 felt that their home environments would provide too many distractions and therefore would prefer another environment such as the library or the office. Interviewee #13 says, regarding his home environment,

A: Just the fact that it's pretty small and like the bed is really close you know, wherever you go. So there's either the bed or the kitchen. So I end up you know, either napping for a while, you know. Just going like, yes I'm going to nap for two hours and then yes I'm just going to fix something to eat and then like another two hours go by.

Q: So distractions.

A: Yes. But also like, even if it was a giant house, it's just really hard to, to not go to bed like.

Others like to maintain a more conventional separation between home and office, interviewee #15 says "I don't want to work from home. Because, it's mainly personal. I like to keep work, the office as a place for work. And home as a place for relax/fun/freedom and peace of mind".

Despite the deep sense of separation, the PhD students appreciate the freedom of being able to choose where they work. Much of this freedom is attributed to ICT and mobile devices in particular, but also that PhD students are not expected to be present everyday (interviewee #9: "But everybody knows that students are never here five days a week"). Interviewee #9 also notes how Eduroam (an international arrangement allowing academics from different institutions to use the network services of those they visit) allows him to work from any other institution where he feels more inclined to be productive – in this case HEC Montréal. Interviewee #10 says, "I noticed that the more I went virtual, the more I was mobile" referring to his efforts to go paperless. He goes on to credit ICT for giving him the feeling that he has more freedom and doesn't get "stuck in one environment". This PhD student in Management provides some details on how ICT has provided him with this sense of freedom:

With the new synchronization methods that Google has it, Apple has it, Dropbox facilitates it. Now the computers at my work, the desktops, are always synchronized. Like I can leave where I am in the text, open another computer, it's there and I can continue writing

I can do the tasks that I like here, the tasks that I like at home, without really having to go through this process of yeah, these files, I close them, then have to put them here to find them back at home with the key or whatever. That became

seamless between the three computers. It's a weird thing. I didn't think it would work, but it actually works

I'm not a big fan of writing stuff on Google Docs, for example, because I know it has an offline service, but it's mainly made to work online. I don't do that. Mostly I have files on remote services – let's say Dropbox – so that's synchronized. Before going out of my place, I let it synchronize completely. When I go out, I have the last version of the file. It happens to me to write on the bus. So it's not necessarily connected at the moment, but good synchronization services – and Google is not among them – they don't have a problem identifying what is the last version and resolving the synchronization conflicts. Even if I edit online and then I sync, it's good

Even on the phone I take a lot of notes now. I made folders for my notes. It's become my Moleskin – the famous note taking... It's a luxury thing. All the writers have one. I really have a hard time managing papers now because I have very little paper. I try to take notes on the phone. Turns out it works! The phone have become much better, so with the phone, I take notes everywhere. In the street, in the bus, while walking

It used to be that, if I had decided to work on this paper at home and then one day I had to move to school, I would lose that day because either I would have to take all of my papers with me or... It wouldn't be an effective use of time anyway if I was at the school without my papers and I wanted to sit and work on my own paper. Now I don't have that. If I have a meeting within ten minutes, I can come to the school and stay for a couple of hours, still work on my papers, everything open on my computer. And then if I want to go back home again, I go back home again. So in that sense it has given me a lot of freedom

All of these cited features of technology seem to help interviewee #10 choose where and when he works which evokes a sense of freedom, however one question arises from this interview – does the interviewee really feel he can choose where and when he works? Also, another part of the interview reveals that this PhD student had expended much effort in order to achieve the seamless relaying between devices. This effort is well understood by myself since I have been undertaking the same effort as interviewee #10, although I have not yet achieved the level of seamless operation. Interviewee #9 also finds the ability to use his smartphone on public transport to deal with his emails and organize his day before he arrives at the office very convenient and helps get more out of his day.

For others, though, ICT doesn't always necessarily translate into more mobility or freedom in terms of space. For interviewee #15, computational power is important because of the need to perform quantitative modelling. Therefore, he finds the laptop he uses – which he judges to be not powerful enough for his requirements – is too heavy to be portable. He would prefer to have a fixed workstation which has the right level of processing power and forgo any mobility computing-wise.

The fact that mobile devices (laptops especially) are physically transportable doesn't necessarily translate into mobility. Physical characteristics such as processing power and weight do not make them desirable to carry or use on the move. The risk of theft also makes them impractical to use in public spaces such as libraries or cafés. According to the information provided by the Facilities Manager at the Desautels Faculty of Management, the building is prone to a lot of theft due to its location directly on Sherbrooke Street – a main thoroughfare – and the fact that much of the student population carries a lot of technology with them. Tablets are more transportable, but as interviewee #15 remarks, they can be difficult to use for work such as writing. Having a tablet, myself, I can confirm that even simple tasks such as writing on a word processor on a tablet is not as simple as it may seem and requires good knowledge of how software works on both a computer and tablet. However, as interview #9 mentions, tablets can be good for reading.

Physical barriers were also quite frequently mentioned such as badge controlled access doors, the walls and doors of offices and the perimeter of the McGill University campus (including barriers for municipal construction work).

Interviewee #7 (facilities manager at Desautels) mentioned how professors were very sensitive about having to abandon their offices during the renovations and how this created a lot of anxiety for many of them during the year it took for the work to be completed. This is a clear show of territoriality, although not necessarily related to technology. However, it could be interesting to investigate whether those who felt more mobile with their work using mobile devices were less prone to be territorial than those who didn't have this mobility.



#### 4.1.2.1.10 Using technology everyday

35 references to technology from 6 interviews make technology use the most common theme (although this is expected as many questions were asked regarding this). The interviews revealed, as is to be expected, quite a lot of variety of technologies in use in terms of devices, software and networks. The use of these devices depended on many factors such as processing power, weight and format along with connectivity.

One recurring theme was impracticalities regarding laptops as mobile devices. Interviewees #9 and #15 cite the weight of laptops as a hindrance in using them as mobile devices. Both describe their laptop computers as cumbersome and heavy which discourage them from taking them on the go. This was mentioned earlier as a factor limiting the sense of freedom of certain interviewees such as interviewee #15:

Q: Do you bring your laptop with you everywhere?

A: I tend not to do it because, as you can see, it's not really portable. I mean, it is portable, but it's still rather heavy

Interviewees #9 and #10 pointed out that they preferred to work on emails on public transport with their smartphones because this device combined with this environment are amenable to this sort of task – work not requiring long periods of concentration or a lot of writing.

Another impracticality regarding the practical implications of laptops – which is related to the weight – is the high risk of theft in public spaces, including the Bronfman building where the Desautels Faculty of Management is housed. Here are interviewee #9 reflections on this aspect:

And the other thing I dislike about public spaces is really the... Like you know here in the winter, you have your coat, you have your... And then you have your bag with the laptop, let's say. And if you're working at Starbucks, by yourself, well are you leaving all this stuff and then going to the bathroom? Or go and get more coffee? It's very annoying. And those things, they disappear in 30 seconds, if you look away. I mean, they disappear inside Bronfman. They report theft, especially in the second floor, all the time. The undergrads. So you don't want to do that. So every time you need to pack your stuff, and then take your stuff to the bathroom, and then 30 seconds later you come back, and then your table is no longer there. So that's also a bit annoying.

Interviewee #9's wife (interviewee #13) shares this perspective and specifically mentions how not being able to go to the bathroom without taking the laptop with her is a hassle. She also points out that the advantage of having a fixed workstation in an office is the bulkiness acting as a deterrent for theft, whereas a laptop is much easier to steal.

As mentioned earlier, on top of being disappointed by the weight and resulting lack of portability of his laptop, interviewee # 15 found that it lacked the processing power he needed to work effectively. This is the same complaint as interviewee #10 regarding lack of power of laptops for "quantitative analysis or data crunching", however this PhD student finds a solution for his powerful computational needs and mobility by either using hosted servers (Amazon for example) which were accessible via the Cloud or designating a desktop as a server and giving himself access from anywhere allowing him to perform the "data crunching" on the move as long as he had an Internet connection.

As expected, connectivity was also an important factor for using devices on the move or using multiple devices for executing the same tasks. For example, interviewee #10 mentions how much he relies on the synchronization between his devices via the Cloud so that he can work on the same document across different devices seamlessly throughout the day. These devices include smartphones, tablets and desktops. The quality of synchronization features offered by online services such as Google Docs or Dropbox are of particular importance since the seamless switching between devices depends a lot on this capability. For this to work, excellent connectivity is required whether through broadband Wi-Fi or mobile (for example 3G) network connections.

The format of devices (a combination of weight and size) was important for determining how suitable they were for various tasks such as reading or writing. Most of the interviewees agreed that smaller devices (such as smartphones) are not suitable for reading or writing:

Q: Do you have any other mobile device that you take with you?

A: Usually, I have my smartphone, but I can't really use it for work. And I have a tablet at home, but I try to use it sometimes and if I have to use it for writing down some small notes, it's ok. But I cannot really work or read or write on a tablet. So if I have to do some actual work, I come here. Even if I have a computer, like I have another laptop at home, but it's really old. And it's like fifteen inches,

so it's really uncomfortable to carry around. I don't know why, but I tend not to use it for work. (interviewee #15)

Large screens on desktops were favored for long periods of work:

To put technology back in the discussion, I no longer have a laptop. So with... I... I don't know. I like to... So I have an iPad to read, and it's very good to read, and write short things, not to write long papers, but you know, write notes and stuff like that. But then when I work, like serious writing, I like to be at a desk with large screens, because then you need to pull up not only the document you're writing, but references. And then laptops are not good for any of those things. Either for reading, just reading, or for writing with other things (interviewee #9)

Unfortunately, I'd say that I print out a lot of papers, so I'm not really good at working on screen, but I tend to use these two screens. As I said before, that applies to computers, to virtual desktop space as well. I need as much space as I can. (interviewee #15)

As we saw earlier on the theme of distractions, certain PhD students (interviewees #9 and #10) would abandon technology altogether in favor of paper so that they can avoid distractions, we also see that some have a strong preference for paper because this much older technology offers them something a device cannot:

I tend to, when part of our job is to read, so when I just have to read, I tend to print out papers and go somewhere in a café or in some open space because as you can notice, there are no windows, which kind of drives me crazy. (interviewee #15)

Interviewee #12 uses online social networking to get around the problem of not having an access card and being identified as an 'intruder':

You don't face any other people that much in the day. Just if you go knock on their door, you'll find other people, but otherwise it's kind of blocking. Even for lunch, we use Facebook to see if anyone is going for lunch "We'll be at the lounge". So that's the way people get around. It's not like going to see the people physically.

Regarding their daily use of technology, some had some very specific feedback regarding certain technologies and what they allow them to do. For instance, interviewee #9 laments how few of his fellow PhD students share their work using Cloud-based services such as Dropbox. He compared the situation as a PhD student to that when he was working in a private company before moving into research. In his experience in private enterprise, he felt his colleagues were keener to use technology to share their work. As a PhD student, the feeling is quite the opposite. He went on to mention how important

face-to-face contact is, for example in academic conferences, in order to be able to continue working at a distance using technology for collaboration. Interviewee #10 is obviously a technology buff and is quite enthusiastic about experimenting with new technologies and features to help him with his productivity. His objective has been to go all-digital and get rid of paper. Although a mitigated success (he complains about the poor design of certain products and the distraction potential), this PhD student has been very committed to achieving going 'paperless'. He has identified many benefits, including going mobile, "Also, I noticed that the more I went virtual, the more I was mobile". His drive to go paperless has even incited him to use a pen that digitizes his handwriting as he writes. As mentioned earlier, in order to make this happen, this PhD student has needed to deploy a lot of technological solutions such as Cloud-based computing, synchronized folders, document version management, transcription engines, etc. As we saw earlier as well, he was very critical of the distraction potential of technologies characterizing certain devices as 'jittery' or 'invasive' and difficult to adapt to different contexts when distractions could be more welcome (for example at home). However, the ability of being more mobile seem to make these issues minor annoyances. Interviewee #14 found that he could clearly separate his work and home environments technologically:

But this year like, I bought a tablet. So then I kind of decided that the tablet is for the apartment, like the tablet is for the fun stuff and to watch movies and that stuff. And the laptop is for the office. So now there is a very clear separation and I didn't work even one day from the apartment this year.

Interviewees #14 and #15 mentioned how during the renovation of the 5<sup>th</sup> floor in the previous year, all PhD students were allocated laptops so that they may work from anywhere. These laptops were not taken back and it was assumed that once the students would get their offices back that they would keep using these portable computers as their main work tool. As mentioned by interviewee #15,

I don't really appreciate the choice because, in terms of computational power, it is less powerful. And even if it's portable, it's not as portable as you would expect, so it hasn't been a really good deal.

The imposition of this solution has not been universally appreciated. It would be interesting to investigate the reasons for this choice by the Faculty and whether any spatial strategy is behind it. "The pressure is that we don't have enough space" says the

facilities manager at the Desautels Faculty of Management, so it is easily conceivable that the Faculty has intentionally provided laptops to encourage more mobile work practices to make the use of space more flexible and ease the pressure on space allocation. In a second interview with the facilities manager, she says

And everybody wants their own office, right, and whether or not that's necessary for their job is something that we're thinking about and whether or not there's ways to improve the technology to help them do their jobs, but do it more remotely.

The Bronfman building, again according to the facilities manager, was originally designed for 1500 persons and today there are approximately 3000 persons using the building on a daily basis. Also, very clear is the intention to provide more space for undergraduate students to work in groups, hence more open spaces with flexible arrangements seems to be the vision for large parts of the buildings. The 2<sup>nd</sup> floor of the Bronfman building with its removable glass partitions and highly mobile furnishings is a good example of this strategy put to execution.

Although the interview with the Facilities Manager yielded codes that didn't completely intersect with the spatial practices of PhD students, they did provide concrete facts and some interesting insights into the day-to-day routines in the building. For example, the facilities manager plans her schedule around the class schedules to avoid the rush for the elevators by students in between classes. So, staff meetings would be planned to start or end before or after these times. Also, the expansion of the Bronfman building is limited by certain bylaws requiring certain buildings in the downtown area to not stand higher than a certain number of floors in order to keep the sightlines to Mount Royal (the mountain at the center of the island of Montreal) clear. Many of the other bits of information provided by the facilities manager are mainly focused on teaching practices and responding to the needs of students. Research did not specifically feature in the conversation and seemed to be left to academics to figure out how to organize themselves for this activity whether it was regarding collaboration or focused individual work.

#### 4.1.2.2 Analysis

This exploratory phase of the study has revealed many themes and topics. What emerges are three overarching themes linking both organizational space and technology: the tension between concentration and distraction; the relationship between the body, space and technology; and, the offer of technology in terms of mobility and sociality. In each of these overarching categories, the role of technology appears as a determinant factor in shaping organizational space.

##### 4.1.2.2.1 Concentration and distraction

Although seen as productivity tools, ICT devices are also very disruptive of work given their design to constantly stimulate the user with new information through notifications, pop-ups, sounds, etc. This is what one interviewee calls the 'jittery' nature of technology. The result is an evident and constant battle to keep devices from distracting work while trying as much as possible to exploit the features for productivity. This paradox generates interesting effects on the organizational spaces of those working in a university environment (PhD students principally). Some develop strategies to avoid devices altogether or seek ways to disconnect from the Internet to concentrate. The former usually involves printing documents to work on them away from devices. This usually involves moving away from locations where devices are usually present – the office or home. So, papers are printed and then brought to cafés or common spaces to be read and annotated. The latter solution would either involve going to a place where Wi-Fi is unavailable to work on a device or to completely switch off the feature on the device. Getting away from Wi-Fi usually implied going to a café or a public space where the devices are not usually connected to the Internet. In both of these cases – working with paper or disconnecting – involves working in alternate spaces to the office or home. All of this because of the tremendous capacity of ICT to distract.

##### 4.1.2.2.2 The relationship between the body, space and technology

Light devices, large screens and fixed desktops all had attractive attributes for the interviewees. All of these had to do with how the human body relates to organizational space and artefacts in them such as ICT devices. A light device is easily transportable

and allows one to work on emails on the bus. However, a relatively light device – such as a laptop – is vulnerable to theft and therefore makes working alone in public spaces impractical. Fixed desktop computers are much less prone to theft due to their bulkiness and their location in controlled areas such as offices. Large screens are ergonomically suitable for long periods of reading and writing; however, they require an office space. The human body, space and technology interact in all of these cases to produce changes in spatial practices. Some tasks are now no longer performed in the office, but outside the workplace altogether (in public transport for example). Use of public spaces are limited due to the impracticalities of carrying devices and exposing them to theft, or are simply now used for specific tasks not requiring the use of ICT (reading printouts of papers for example). These characteristics of both the ICT artefacts, the human body along with the environment combine to shape how interviewees organize their work spatially throughout the day. There seems to be an intricate link between the technology and organizational space through the human body.

#### 4.1.2.2.3 The offer of technology in terms of mobility and sociality

Technology's role in both mobility and sociality is evident in the conversations had with the interviewees up to now. ICT breaks down boundaries while helping create new ones. More can be done on the move with ICT and at the same time certain devices can be designated as for 'fun' and others for work. Technology is also responsible for enforcing physical barriers such as access-card access control in buildings. However, these can be circumvented by exploiting the sociality offered by technologies (such as social networks) allowing one without authorization to pass through with the aid of another person with authorization. The same technologies can also help avoid undesired contact with others while not falling into isolation. ICT also seems to have an important role in shaping the patterns of collaboration with others. Although face-to-face contact is important, it seems that once trust is established, collaborating at a distance is simple with some readily available technologies such as Dropbox and Google Docs. Increased mobility and freedom also mean the interviewees have the need to be more active in managing their spatial working arrangements on a daily basis. This often involves the exploitation of technologies and their features to help them do this. Although this may seem to create a circular and deterministic logic with technology driving new spatial

practices and at the same time these new spatial practices needing more technology, technology only underpins and facilitates a process of organizational change that is constructed socially. Furthermore, technology use generates new problems that eventually may require old-style solutions or the exclusion of technology altogether. Aversion of technology has, on occasion, produced new spatial practices.

With these three overarching themes coming out of the fieldwork in the exploratory phase, we finally get a glimpse at how ICT and organizational space can be connected at a conceptual level.

The exploratory phase of the study allowed for the following:

- The selection of a specific spatial practice to study
- The selection of a specific population to study (in relation the spatial practice)
- The formulation of a focused research question
- The development of a theoretical framework

A variety of broad spatial practices in business schools are undertaken on a daily basis – teaching, admissions, research, dining, socializing, etc. Each of these broad categories may be broken down into sub-categories. For instance, teaching can be broken down into lecturing, evaluation, coaching, etc. The selection of both a spatial practice and population for the study depended on several factors:

- Ease of access (for interviews, observations, documents, etc.)
- Managerial relevance
- Interest (both personal and for the community)
- Fit into the literature and addressing research questions not yet addressed
- Prior knowledge of the practice

On the basis of these factors, it was decided that the intensive phase would be focused on the collaborative research practices of academics in business schools.<sup>6</sup> The initial population targeted were faculty (lecturers, professors, research fellows, etc.), but was broadened to PhD students to include any researcher with a physical presence in the

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<sup>6</sup> This narrow focus on collaborative research practices was eventually abandoned



building and undertaking any form of collaborative research. Other spatial practices were either deemed too specialized to be generalizable to broader management research, or not of any relevance in the context of a business school (the case of the business school doesn't bring any added interest). For example, focusing on teaching would produce a study with main contributions pertaining to the literature on pedagogy in higher education rather than any practices that could be generalizable to other types of organizations. Research activity isn't limited to academic institutions. There are researchers working in the private sector (research institutes, think tanks, large corporations) as well as governmental agencies. Much of the work undertaken is collaborative in nature (projects involving more than one researcher). Some consultancies undertake research and are actively involved in the production of knowledge regarding management practices in organizations. There is also very little knowledge on this type of activity in organizations and this is reflected in the literature (see literature review). One advantage of focusing on this activity is that I already have prior practical experience working in collaborative research projects and am familiar with the business school research environment. It is also of much personal interest to me.

## 4.2 Phase 2: Intensive Phase

During the exploratory phase, some new theoretical insights were made available through the data and, more importantly, some discoveries in the literature. Leonardi's framework seemed to fit the study and easily adaptable (see research design section). This adapted framework, through the related concepts of constraints and affordances of ICT, provides a sensitizing device (Walsham, 1993) for the relationship between ICT and organizational space. The data collected during the exploratory phase indicated a certain role of mutual structuration between the characteristics of the technologies (affording or constraining) and spatial practices. This is most evident in how those interviewed described their efforts in partitioning their time-space into work and home/personal spheres and how their efforts would either be stymied or supported by technologies. Interviewee #10, for example, describes how he has leveraged the Cloud to free himself from the constraints of either carrying a laptop around or a USB key with all of his files. On the other hand, he is frustrated with the way technology is intrusive with lack of control over notifications and other forms of distractions.

Although the data collected during the exploratory phase was not targeting the specific practice of collaborative research, many themes regarding collaborative work and the constraints or affordances of technologies emerged and contribute to the empirical basis for the inquiry at hand.

The coding of data – undertaken with the help of NVivo – was (Bazeley & Jackson, 2013) performed with the help of a starter coding system based on the theoretical framework developed earlier (see theoretical framework section). Three principal related themes were established to start

- ICT Affordances
- ICT Constraints
- Spatial practices – research collaboration (changed later in the coding to just Spatial practices – research with a sub-category on collaboration)

The first two themes encompass the characteristics of ICT. These three themes were added to the resulting code structure from the exploratory phase before actual coding began.

#### **4.2.1 Case 1: McGill University – Desautels Faculty of Management**

##### **4.2.1.1 Coding**

Coding for this phase using Leonardi's framework has turned out to be very difficult. The starter coding system proposed based on the themes of ICT Affordances, ICT Constraints and Spatial practices – research collaboration did not yield many passages of interest and were very limiting in conceptual scope. Presenting a specific challenge was the identification of clear ICT affordances or ICT constraints. In most cases, when speaking of using technology daily, interviewees would either present a mixed bag of affordances and constraints or speak of the same feature of a technology as helping as well as hindering their work. Distinguishing perceived affordances from constraints when using technology from the interview data would prove to be futile and would in fact seem to be a reductionist exercise. Precious information about the complex relationship interviewees had with technological artefacts would seem to be lost by separating the 'positive' perceptions of their benefits from the 'negative' ones. The data from both the exploratory and intensive phases show that constraints and affordances often manifest themselves together as a single dimension, much like the two sides of the same coin. The same passages would end up getting coded in both categories thus making their separation redundant. What emerges early from the coding of the intensive phase of the McGill case with regards to ICT affordances and constraints is a certain paradox – where affordances and constraints are present in the same instance of practice. For example, the sense that a tablet can offer the benefit of avoiding the lugging of large amounts of papers for reading is expressed in the same breath as the frustration of not being able to properly annotate the papers (even though this feature is available in most of the cases). This led to the creation of a new category 'Affordance paradox' to capture these instances. Whilst this captured most of the data regarding practices reliant upon ICT, there remained many instances where there was a clear expression of affordance or constraint. These instances would be classified under the categories of 'ICT Affordances' and 'ICT Constraints' as per the starter coding structure. Other new categories which emerged during this subphase of coding for the McGill case are : Habits & Routines, Place

as a mindset, Generating stress, Time zones, Isolation bubble, Copresence, Privacy or not disturbing others, Freedom from connectivity, Teaching duties, Addiction, Mess, Administrative collaboration, Anytime, Attachment to place, Data Security, Heavily dependent on technology for research, Seamless, Printing & Paper, Loneliness, Looking professional, Minimal ICT Requirements for Job, and Third Spaces. Therefore, a total of 23 new categories for coding when including Affordance paradox. Other sources, such as observations and photos of the sites, were coded once these new categories emerged.

Out of these 23 new categories, those containing significant amounts of sources deserve to be examined in some detail since they will determine the manner in which the coding structure will evolve. These categories are Habits and Routines, Affordance Paradox, ICT Affordances and The Body. In examining each of these categories, I will develop subcategories to better structure the data for analysis.

#### 4.2.1.1.1 Habits & Routines (65 references)

Although the category Spatial practices – research collaboration (changed later in the coding to just Spatial practices – research with a sub-category on collaboration) in the starter coding structure based on Leonardi’s framework would capture habits and routines for research collaboration, it was quickly realized that much data regarding the daily habits and routines would have been lost since they were not explicitly linked to a research activity. It was therefore decided to create a new category. Since the habits and routines of academics in business schools are centered around the three activities of teaching, research and administration, limiting the coding to purely research activities would have been penalizing. Each of these three activities influence each other in the way they structure the overall regular spatial practices of academics. Furthermore, most of the interviewees would express their workaday as a mix of different tasks which were difficult to isolate given their interrelated nature. Within this new category, 4 subcategories emerge from the data: Organizing the workaday in time and space; Managing ICT; Managing paper; and, Cycles.

#### 4.2.1.1.1.1 *Organizing the workaday in time and space*

When describing their daily routine, most of the academics interviewed would state what periods of the day or week would be spent where: “I spend most of the time in my office actually, from morning until evening and after usually I go back home at around 7 or 8 o’clock in the evening” (interviewee #18); “So from Monday to Friday I come to office. It’s very rare that I come to office on the weekends, but other than that I come to office often. If I’m not out of country I’ll be in my office.” (interviewee #21); and,

Q: Okay. So you said two days a week you work from home.

A: Yes. On average.” (interviewee #20);

In the case of interviewee #18, there is a suggestion that the daily/weekly routines for himself and his colleagues are determined by the distance between home and the workplace:

Q. So, do you very frequently, go to the office during the weekend, or in the evening, do you ever?

A. Yeah, yeah, if there’s anything I need to bring, I can drop by anytime. Yeah yeah

Q. OK.

A. But normally I come to school everyday, so ...

Q. Everyday and even the weekends?

A. Yeah, I can stop by during the weekend. Yeah, yeah

Q. Alright, ummm, probably the last ... yeah go on ..

A. I think this not a typical pattern for most of the people ...

Q. At the faculty here?

A. Yeah, yeah, most of the people live further away from the office, yeah yeah (interviewee #18).

This is not a point raised by his colleagues in the other interviews. However, other factors seem to influence routines. One of them is family obligations:

So basically I have two work spaces. One is my office here, and I also have a home office. So during the weekdays I come to my office every day. So... In fact, for the time I’m teaching, and doing other administrative work, I’d research in my office, so from I’d say eight thirty to four thirty, that’s my regular hours that I’m in my office. And then because I have a young daughter, I have to pick her up and then go home and... So I do... A little bit of work in the evening. Mostly after nine, nine PM. So from nine PM until, I don’t know, maybe for one or two hours, I do some work in my home office. And during the weekend, occasionally I also work in my home office. So that’s my kind of weekly routine. (Interviewee #23)

For others, the daily or weekly routine doesn’t follow a set pattern in time, however follows certain patterns as a function of the mood of the day or the family context:

But actually it really changes from one day to another. Like if I feel like I'm going to be okay working at home, I'm going to stay at home, but if I can I'm trying to come to the office because I feel like I have much fewer distractions. Like I have to work, like there's nothing else I can do. Like at home I can do different things. (Interviewee #19)

Q: Okay. Do you ever feel like you... Possibly not with this weather, but any time when you feel like, okay, I've had enough of sitting here in this office, I have to go to a coffee shop?

A: That happens quite a lot

Q: Okay

A: Yes, actually that happens. Like in the foyer, I was just saying as well, you know, if I want to come here as well for a relationship we've got it, because if I wanted at some point to take a break, I know that I have [inaudible] or I have [anonymized], I have people I can go and talk to or I have... You know, so that's nice as well. I need to take a break from time to time, it happens to me as well, and I'm doing that more and more now that I'm pregnant. I'm doing the morning here, like up to two and three, and then I go home and I finish the day with more manual tasks. Like easy task at home. (Interviewee #19)

In the case of interviewee #19, there is also the matter of sharing both the home and workplace offices with her husband who is a consultant and frequently also works from home which has consequences on patterns and movements:

Yes, one thing that's tough, that if there is only one office space, and so when my husband comes home on the weekends, then we fight for office space, right? So that's an issue. So it happened that actually I send him here, and he's working from here, and I'm working from home. Or when we need to work on the weekend, when we're both working, or the opposite, I come here and he stays at home. But we cannot work together in the same... In the apartment. So if we need to... If the two of us need to work, one is coming here. (Interviewee #19)

For interviewee #16, the routine is a matter of strict discipline and regularity in time, "I'm always imposing on myself a nine to five and then I rarely work outside of these hours" and when referring to meeting colleagues about the writing of a paper for a publication, "every week we meet at the same hour, same day for an hour". Discipline comes up in interview #20 in the form of a struggle to maintain a strong psychological separation between work and personal life,

And I would feel compelled to do it. And I've stopped working on weekends only for about 18 months now. So I fear that like, like an alcoholic I could get back to doing so. I would fear going back to going to my older habits of working too late at night, over the weekends and all that.

Interviewee #20 also describes how some old habits from her days as a PhD student stay with her to shape her routine as an academic,

Well I collaborate with some colleagues at HEC Montreal. So I, well. At least once every other week or sometimes every week. When the week they work I will go there, especially when I was working with my former advisor, it stays with you. You're the one that goes there. For a long time I was working there on the week and now I have another colleague so I go every other week. So yes. I work there as well, but more as a kind of a visit thing. So I have a few things there that belongs to me. I used to have a laptop there and all that, but just that.

Others, such as interviewee #23 are more flexible regarding their routines at home depending on work demands, "Yes. So that's probably the... So but when I have revisions that I need to finish urgently, I work until late at night." In the case of interviewee #17, the day is structured based on natural productivity levels and external constraints such as meetings and road traffic,

What else? I tend to try to organise writing in the mornings because that's when I'm best. And then, meet with people in the afternoons, if I need to do that. Sometimes you can't control it, you have to go to morning meetings. I used to work quite early in the morning, like I started at 6:00, and would work... Try to work without interruption till maybe 10:00 or so, and then I'd miss the traffic if I had to come in.

Interviewee #17 specifically mentions having built-in a sense that calls with academic collaborators in other time zones happen at specific times of the day: "So I've gotten used to that sort of, okay, end of day is the right time for those Australia calls."

According to Interviewee #19, the tasks she is required to accomplish during the day are determinant to deciding where to work on a given day, "So I tend to do big tasks at the office. Like [inaudible] writing research here. If I have to just grade papers, for instance, I can do that at home," and, "I think I have actually a tendency to write at the office."

The local climate and urban environment offers opportunities for interviewee #21 to change her routine and discover third spaces such as coffee shops during the weekends:

Q: Okay, you mentioned about going to coffee shops.

A: Yes.

Q: When do you do that?

A: That will be the weekends.

Q: Okay, that will be the weekends.

A: Yes.

Q: And would that be that those are coffee shops close to your home?

A: No, I mean in Montreal, I mean you know Montreal, it's not really big and after living in New York, Montreal really isn't that big. I just grab my papers, my tablet and then discover a coffee shop. (Interviewee #21)

#### 4.2.1.1.1.2 *Managing ICT*

As expected, ICT features prominently as a factor in the shaping of the workaday of the academics interviewed. Some of these factors are presented as outright constraints:

I don't know why, maybe it could be my misunderstanding, but data stream, when I run data stream I can't really do anything else on my desktop efficiently. So sometimes I just come here, run the data stream and leave, go back home. (Interviewee #21)

However, most of the time, habits are formed out of strategies making the most of the opportunities for productivity presented by ICT while minimizing the effects of various technical constraints (for example, cumbersome devices) or distractive potentials (for example, persistent email notifications).

When I was bringing my Mac here, I preferred to bring my Mac to the classroom. Which meant bringing my adapter and bringing all of the stuff with me. But it was still a better deal than to do the USB key, because you've got ten minutes between classes. So one year I was back to back to back in the same classroom, it was worth... If I'm three hours somewhere, it's very often worth to install my stuff. For an hour and 25 minutes, and coming back and staying an hour or so, it's easier over the USB key. But now I'm not bringing my Mac every day, so a USB key is what I have to do. There's crazy little stuff like I often use a Pdf file with financial statements on, like PowerPoint slides. So I've been alt tabbing to something else for a long time. (Interviewee #22)

Interviewee #16, like his strict 9 to 5 work routine, enforces some strict rules regarding his use of ICT, especially his smartphone "I have a zero unread mailbox policy", "but I turn it off at night". Interviewee #16 suggests that, although he values the convenience of a smartphone – allowing him to check his emails on the go – he is cognizant of its potential to disrupt his sleep. This disruptive potential is all the more important given that he has put in place a policy of 'zero' unread emails. Policies regarding unread emails and the speed of response help shape the habits of other interviewees:

But iPhone, I mean my emails, yes. That's good to be able to check emails, see there is something of importance. At any time. But I'm usually answering emails relatively fast, so on that, yes, if I have an email that's... I need to answer, and I have it on my iPhone, I just do it right away. I never leave like more than five emails unread in my email box. (Interviewee #19)



And now I'm looking at myself, maybe it's not every two minutes, but it's every 10 minutes. My students generally receive an answer from me within an hour let's say, the worst case scenario. (Interviewee #21)

However, interviewee #19 cites those times she's accompanying her husband on one of his business trips as an occasion when her ability to check emails is limited and therefore her need to check them is diminished, "But it's... I don't need to access my emails 100% of the time. I need to access them maybe three times a day, in the morning, at lunch, and at night. But that's it. So..." It seems, in this case at least, the need to check and process emails is determined in part by how easy it is to do so and where one is located.

Having multiple devices and computers, interviewees didn't feel the need to carry a laptop with them everywhere they went, "No I just leave my laptop at home" (Interviewee #18), especially given they readily use tools to synchronize their files across the devices or at least give them access from any device connected to the Internet, "Yes, I mean I'm using Dropbox all the time" (Interviewee #19). Interviewee #23 describes how he uses the institution's network drive to get access to his files when teaching in classrooms:

A: So I put my slides on the network drive, and then I go to classroom. I log in with my ID and password, then I can open the file. So only bringing like the laser pointers and syllabus, those things.

Q: By syllabus, you mean paper?

A: Yes. Sometimes I need to find some information.

Q: You bring your iPhone, I presume?

A: No.

Interviewee #20 describes how for a past collaboration she had access to a laptop and network resources in another institution in Montreal – HEC:

A: For a long time I was working there on the week and now I have another colleague so I go every other week. So yes. I work there as well, but more as a kind of a visit thing. So I have a few things there that belongs to me. I used to have a laptop there and all that, but just that.

Q: Okay and what. What kind of I mean do you use, I guess you have an account there? At HEC?

A: I used to but I'm not sure because recently I haven't logged on there. But I work with (...) but yeah they used to. And the secretaries are nice to me as well. They do stuff for me, so I kind of was able to recreate a bit of a set-up.

#### 4.2.1.1.1.3 *Managing paper*

Paper carries great importance to those academics interviewed, and this is a critical factor in shaping habits and routines. Of particular concern from a spatial stand-point, is the question: How do academics physically manage the paper they produce and subsequently use? In the following case – interviewee #19 prints out those journal articles which she feels are the most important for her literature review and keeps them as a stack on her desk. As each paper is processed, they are disposed of:

Q: Okay. So when you say work on a paper, you're talking about working on paper you're writing...

A: No, no, not necessarily a paper I'm reading. Like I'm reading as well a lot, to be about [inaudible]. Usually my review of literature, like all the papers I'm really going to cite in a paper I'm writing, I like having a stack, and then I can just take them and okay, of the citation, be exactly sure what they're saying. So...

Q: Okay, that's interesting. And what... Just to stay on that point, do you ever scan them and put them... How do you... Do you carry them with you?

A: Well I usually have them in Dropbox, but I'm using them only to print them.

Q: Right, but in terms of the annotations, how do you keep that information? Do you...

A: No, I don't scan them. They're on my desk for all that I need them, and then they go to the trash. So... No, I don't keep the information.

Q: You don't keep it, okay.

A: No.

In the case of interviewee #20, the practice is slightly different in that she prints out the documents in the office to then take home to process:

I would usually print them and bring them home to read. For example if I have my students' paper to assess. Usually I know if tomorrow I want to do and I'll work from home then I'll print it here before.

Although printing is deemed important, some of those interviewed would not get out of their way to get documents printed, "but like on a morning like I have to print something, I wouldn't come to school just for printing" (Interviewee #21). Interviewee #22 is keen to avoid paper altogether.

Intriguingly, it seems that when it comes to dealing with student evaluation, grading on paper carries more legitimacy:

So what I do is I have graders and what I usually do is that I have them print all of it, then write with a red pen the correction and then I hand it back to students for 10 minutes, they hand it back to me and then I keep it in one of my drawers (Interviewee #16)

This preference for paper when dealing with students is echoed in the new category, Affordance Paradox where instances like this occur when academics deal with colleagues.

#### *4.2.1.1.1.4 Cycles*

Although the habits described by the interviewees were generally concerned with quotidian or weekly routines, some cyclical aspects of the academic calendar were deemed quite critical in defining habits. For many of the academics, the deserted office landscape during the summer holidays is considered to be a sad interlude only ended by the great surge in activities at the beginning of the academic year – “in September everybody’s coming back” interviewee #16 says happily referring to this moment. Another key moment in the academic calendar, especially for collaboration, is the conference season – generally through the months of April, May, June and early July. According to interviewee #18, he goes away to conferences “Three or four times” a year. For interviewee #17, being at the head of a research team, means the organizing of yearly retreats for all members: “So, once a year, we spend, I don’t know, anywhere from three to seven days together somewhere, where we can all be physically present”.

The climate of Montreal is also cited as an influencing factor in shaping daily routines around seasonal changes:

A: So it’s split a little bit and it’s less tiring. But yes. I mean, [inaudible] as well we’re in Montreal, so depending on the weather, that is going to impact my decision to come to the office or not. Right, there were some days in January that were just horrible, completely icy. And again being pregnant I was like, I’m not working, I’m working to the office. I’m not working by this weather, I might just fall and... So no good.

Q: Yes. And I suppose... So then you stay at home and you work from...

A: From home.

Q: From home, okay.

A: I’m doing my best to work from home. (Interviewee #19)

Once winter passes Montreal is beautiful, so I’ll go to parks or just step outside. So again it’s going to be... the thing is that if the weather is nice I can actually leave office at around 4 p.m. (Interviewee #21)

#### 4.2.1.1.2 Affordance Paradox (63 references)

In an echo of the tensions found in exploratory subphase 1.2 (technological distraction vs. hallway distraction or silence vs. noise), ICT use shows up as a source of frustration where interviewees find it difficult to reconcile all the benefits offered by technology with corresponding annoyances and limitations. In most cases, this manifests itself first as expression of enthusiasm about how a specific device or IT service increases one's productivity, quickly followed by how such devices or services either distracts them (such as notifications) or hinders their productivity more directly (such as lack of connectivity).

These affordance paradoxes can be divided into four broad subcategories: Paper, Uneven distribution of affordance, Ergonomic issues, and Distraction.

##### 4.2.1.1.2.1 Paper

All of the McGill academics interviewed – with one notable exception (interviewee #22) – preferred to work with paper copies of documents over electronic versions. This was the case regardless of seniority, although, the most senior academic interviewed (interviewee #17, now retired) was particularly reluctant to use ICT – even for qualitative coding. Even when in possession of a laptop and on the move, she would prefer the expense of having documents printed at a local service centre. Her preference for paper was widely shared by colleagues.

Interviewees # 18, #19, #20 and #23 mention the tactile and intuitive nature of paper as reasons for their preference for reading and annotating documents. Interviewee #18 says “because sometimes I like to hold the paper in hand, and it’s also easier to read the paper on a hardcopy”. Interviewee #20 says she likes to “scribble on things” and that she could never get used to working on documents in pure electronic format – although she has started reading novels on a tablet. She adds that the only case where she would resort to using an electronic version is “If I’m really stuck. That I, you know I’m on the go, going to a meeting and I get a file that I have to, otherwise no”. Both interviewees #19 and #23 prefer paper versions of documents for reading, but also for annotating. For interviewee #23,

I think the printout actually works better for me. For pure reading, I can read off-screen, but for like really... Like for revisions for example, I have to read the really... I have to concentrate, and I have to, you know, sometimes make notes. So for that purpose I think the printout works a lot better. So...

In the case of interviewee #19, "I'm still like the older... Like my pen and highlighting in colours and things like that. So... If I need to work on a paper, I usually print". However, she does go to mention how she would like to try to limit her printing because of both budgetary and environmental concerns.

This preference for printed matter by academics comes into sharp focus in another way from the interviews. Interviewee #22 has the explicit goal of avoiding paper in a "massive way" so that he can access documents electronically from wherever he finds himself. However, his efforts are frustrated by others' preference for printed matter. He complains that office staff and colleagues circulate paper copies of documents by default. He cites administrative meetings as one example of how difficult it is to change habits. Although he tries to attend these meetings with electronic versions of documents, he often finds those versions outdated and that the most recent versions are in paper format distributed for the meeting. Expressing his frustration, he says,

So I'm using my iPhone very much. I mean, I think I've pissed off my dean a few times, because instead of going to see him with a piece of paper, I call it on my iPhone, and I don't think he's very happy about that.

Interviewee #22 also laments the fact that teaching duties – especially for grading – often require the printing out of hundreds of student documents (assignments or exam copies),

So yes, it's a little bit... I mean, the professors are part of that, most of my colleagues that do electronic end up printing everything. And frankly I think it's a waste of time. So that's why if I'm about to print that for a student printing, it takes 30 seconds. For me to print it for each student is 30 seconds times 250. And that would be a couple of hours. I can do something better with my time.

Interviewee #16 even suggests that the grading of student assignments has more legitimacy when it is performed on printed matter than with electronic versions,

I still like...I still think that if you print it and then you grade it with a red pen it feels better. I mean I think to the student I think it feels more like an actual grade than having a comment in a Word document. I could have a better system. (...) ... so the whole thing is like students have to believe that the grading system is strong,

because if they don't believe it then they're going to start fighting it back and then I'm going to have a line of people lining down my office asking me to like make, like have a second look at a grade or something like that. So for the system to look as strong as possible I think a printed version with a red pen is actually the best way to do that.

#### *4.2.1.1.2.2 Uneven distribution of affordance (dependent on place)*

Although all of the academics at McGill were apparently satisfied with the ICT at their disposal to perform their professional duties, it would eventually emerge – usually towards the end of the interviews – that there were some lackings. These mostly came up as specific issues preventing the seamless use of ICT and services across space – usually between the home and the workplace.

Given the preference of McGill academics for printed matter – often in large quantities – it is no surprise that many issues arose from this need in terms of the availability of printing across space. Interviewees #19, #20 and #23 expressed their need for regular high-capacity printing. The fact that this was only available to them at the workplace would ensure a presence in the office on a regular basis. These high-capacity machines were combination copier-printer-scanners that would be shared by staff and serviced by the McGill IT services. Interviewee #19 regrets not having the same capability for high-capacity printing at home, whilst interviewee #23 keeps an individual printer in his office for quick jobs and in case there is a queue for the high-capacity shared printer. For interviewee #18, not having a printer at all at home is a big reason why he works in his office instead of at home. Interviewee #19 expressed the desire to have some form of solution for mobile printing that would be practical.

Connectivity across space was another area throwing up issues for interviewees. Interviewees #22 and #23 complained of too many locations where Wi-Fi is not available, thus making seamless access across space difficult to achieve. Interviewee #22 specifically mentions not having access in other universities and complains about the excessive cost of data plans with mobile operators. Interviewees #19 and #23 find that the slower speed of Internet connections in the workplace hinder their productivity to a certain degree. Interviewee #19 specifically mentions being unable to show YouTube videos in class and interviewee #23 finds the speed of the connection to be much faster

at home, yet is discouraged by the small screen on his laptop there. On the other hand, interviewee #18 is forced to use a remote connection to his office computer if he wishes to work from home since it runs some special software he needs for his work,

One thing is because even if I use remote desktop, it's not very efficient, and the connection can be very slow sometimes. Some of the icons cannot show correctly on the screen so I prefer to, and also my home is very close to office so, just a few minutes walk, so

Therefore, he makes the short walk to his office instead of working from home. This is on top of the fact that his desktop in the office has more computational power than his laptop at home. Interviewee #19 cites a similar reason for preferring to work at the office:

My desktop is actually better. My laptop has three years now, so I think I'm eligible to change it in July, and I'm looking forward to that. Because it starts to get a bit slow. But otherwise, it works okay. But my desktop is more... It's more performance, it can never crash like my laptop crashes. Like I have the blue screen of death very regularly.

Other issues cited are Klickr not compatible with iOS which makes using an iPad impractical for classes (interviewee #16); poor projector connectivity in classrooms for iPads (interviewee #22); not having the same setup across shared computers (interviewee #22); and, being obliged to store sensitive data on the Cloud due to the design of the iPad (interviewee #22)

#### *4.2.1.1.2.3 Ergonomic issues*

The limitations of the human body – in its interactions with ICT artefacts – has emerged as a major factor impacting the effective daily use of technology by academics. The size of the devices and their screens, their weight along with their keyboard interfaces all appear as obstacles to using mobile devices to their full potential. Both interviewees #16 and #23 feel that their smartphones are only appropriate for monitoring emails and not replying due to the difficulties in reading and typing on such a small device. Both would wait until they have access to a bigger device to give more attentive consideration and eventually reply. Here is an extract of the exchange from interview #23 when discussing smartphone use:

Q: Okay. And do you find yourself doing anything... Would you read an article on your... Or would you look at...?

A: On my smart phone, very rarely. I sometimes, you know, there's a news article, or even like email, if it's long, if it's dense email, I'd rather, you know, read it... I quickly can scan it, but I try to read it from bigger devices. Either iPad, my laptop, or my desktop.

Even the much bigger tablet screens are considered too small for serious work such as reading documents (interviewee #18). An added issue regarding tablets is using them for typing large amounts of text and the resulting conundrum this has caused for interviewee #22:

I haven't done this yet, but I see the numerous little Bluetooth keyboards for iPads, and so my iPad would still work with this. But I had a keyboard, but I didn't like it. But I'm still reluctant to have this, because if I want to carry a laptop, I'll carry a laptop. But I'm seeing people being efficient and doing email with these things. So that's something I'll definitely consider. But I don't want to lose the notion that I have something in my hand just to read, and so I have to find the right keyboard, or something that I can just remove easily, and not carry around. So I bought an Apple keyboard to do this, but I'm not using it that much. My Apple Bluetooth keyboard I'm not using. As much as I thought. I used to do this when I would do an updated copy, and then I would type my comments at the bottom. I found out that it's easier to just send it to my email and forward the file to people and type my comments.

Interviewees #18 and #23 also prefer, by far, the comfort of the large screen of a desktop computer in the office to that of their laptops which are located at home. An added inconvenience of laptops is their weight and the hassle they represent when going through airport security according to interviewee #19.

A: So that's one thing I could. Other than that, I like to have two screens.

Q: Yes sure.

A: Yes that's the, it's the IT manager who suggested that to me a few years ago. And when I work on qualitative analysis, on papers or even I work on something my email is open and I love that. So I don't know if it's relevant, but I love that. My two screens. I miss that at home.

Q: Okay very interesting.

A: My big laptop and my two screens. (Interviewee #20)

#### *4.2.1.1.2.4 Distraction*

The tension between the productivity offered by technology and their distractive capacities carries over from the exploratory phase into the intensive phase. This manifests itself at numerous moments during the interviews. Like interviewees #8, #9, #10 and #14 in the exploratory phase, interviewees #16, #17 and #21 developed strategies to abate the distractive – and disruptive – potential of ICT. Interviewee #17



uses a lakeside log-cabin in the Great Lakes region of Canada as a calm retreat for creative work and specifically ensured it was not connected in any way electronically (Internet or phone):

And so we've decided for now, we don't want to be connected, because it transforms that place into a sort of 100% work and connectivity, which we'd just soon get away from, and I know that might seem like an anathema. Anyway, that's how we've handled it now.

Interviewees #21 and #23 explicitly refer to 'addiction' when speaking about their relationship to connected devices.

Well to be honest, since I started using smartphone, it's a really nice device. But I guess it becomes an addiction. There's huge variation in terms of addiction. But because I don't think I need to actually... So like this morning, I was checking my email with my smartphone, and I thought, really I don't need to check my email that often, right? Like when I didn't have a smartphone, I didn't do that, but life was okay actually, without doing that. (interviewee #23)

It's almost a habit I think. So I always put it in my pocket, and then... So I even without... Unconsciously, I think, it's with me. And it's sometimes, you know, when you don't have your iPhone, my iPhone actually I think it makes me a bit nervous. That's a sign of addiction I think. So that's... Those are the moments I think about this, maybe I should cut down on using smartphone. (interviewee #23)

Like when I was doing my PhD I had this one professor who told us that he had this addiction of checking his email every two minutes and he was actually like that. Whenever I sent him an email he would reply back to me just in two minutes. And I was like I was shocked by that. And now I'm looking at myself, maybe it's not every two minutes, but it's every 10 minutes. My students generally receive an answer from me within an hour let's say, the worst case scenario. Even if I do that I think it's too much. It's like I need to be disconnected time to time. It's like it's not that I'm being on the Internet, it's not like I'm reading scientific papers all the time. I read tabloids. It's like Yahoo.com and then the stupid news. So it's sometimes it's like if I force myself not to have that kind of access, it's good, it's beneficial. (interviewee #21)

Like interviewee #17, interviewee #21 seeks freedom from connectivity by working from third places:

Here's the thing, sometimes I actually deliberately look for a coffee shop that doesn't offer free Wi-Fi, because that will force me to read my papers. If I have Wi-Fi I'm going to check my email and then few minutes I'm going to check newspapers and then suddenly end up watching cat videos on YouTube. So that's why sometimes I actually force myself to go to coffee shops where there's no free Wi-Fi. I'll just read my papers.

Interviewee #16 uses a different approach to manage the disruptive capacity of his smartphone – by turning it off:

So for productivity it's pretty good, but I do think at some point, you know, if you really want to be focused on one thing you just turn it off. I don't think you can be very productive with like an iPhone on your lap.

A feeling that technology diminishes the collaborative experience was also quite prevalent. Interviewees #17 and #20 have an explicit preference for face-to-face contact for collaboration. Interviewee #17 seeks funding for regular 'team retreats' because,

And I don't think the Skype... We have a lot of team calls, but it's not as effective in terms of building a sense of community, and building a sense of us being... Working together, misunderstandings are more likely to occur and that kind of thing.

However, she finds it increasingly difficult to justify the funding because of the expectation from funding bodies that these physical meetings can be replaced by virtual ones:

Q: Okay. Did you still have those getaways? Did you still have those?

A: Yes, we did.

Q: Okay.

A: And then, I budgeted for them twice a year.

Q: Okay.

A: And the grants were more accepting of that than they are now. Once a year was kind of, you don't really need this, but all right, we'll do it, you know, kind of thing.

Q: And you think that that's because they expect you to be able to manage with [inaudible]?

A: Absolutely.

Q: Right. Okay.

"Yes I hate the phone" says interviewee #20. She would especially dislike this mode of communication when it involves a collaborator who is co-located, "For example if I have to talk to someone in this building, for me even if it's another floor, the idea of taking the ... I'll get out and I'll go see them. I never phone my colleagues". Her dislike of the telephone is so strong that she discourages her colleagues to leave voicemail "Because I never think of checking my voicemail."

In more indirect ways, some of the interviewees lamented the ease with which technology can diminish the social experience at work and the peace of the home. For interviewee #21, although technology allows her to work from home, she prefers to

come to the office on a regular basis to maintain a face-to-face social contact with others. She even decided against the convenience of having a printer in her office so that she would be obliged to travel to the printer room to fetch jobs and hopefully bump into other people to socialize. In the same vein, while interviewee #17 appreciates the convenience of technology for keeping contact, she believes it is important to maintain a physical presence in the workplace, especially for office hours. She regrets not seeing enough of her students in person and the fact that they seem to be more comfortable with keeping touch via electronic modes. This professor – on the verge of retirement at the time of the interview – suggests that younger generations like to be constantly available online, “I have a niece who’s in... At University of Michigan, who’s... Who uses Skype for her phone. And so whenever she sees me on, she likes to call and chat—I don’t like that”. In the case of interviewee #20, the convenience of taking work home thanks to technology has had consequences for which she has had to make efforts to attenuate:

So, I try at home not to pile up things the way I used to. So up till now I’m pretty good at being better at keeping a more, I don’t know, Zen environment. So that would. And also I think it would bring all the details, the annoying obligations with me.

Interviewee #21 shares her admiration for older generations of researchers who were able to work without computers and their attendant disruptive dimensions.

#### 4.2.1.1.3 ICT Affordances

This category captures those instances where ICT was presented as clearly facilitating practices perceived as beneficial. Clear productivity benefits which emerged from the interviews all stemmed from a sense of not being obliged to work in one specific place or having the feeling of being able to work from many different places. Three related subcategories emerge: Seamless work across space and time, Ease of sharing files with others, Working paperless.

##### 4.2.1.1.3.1 *Seamless work across space and time*

All interviewees from McGill, with the notable exception of the professor who was on the verge of retirement (Interviewee #17), found ICT allowed them to replicate and spread their work environment across space and time. Although, as seen in ‘Affordance

paradox', this replication would not be as seamless as suggested in the title of this category. Furthermore, this replication also presented many complications in terms of managing their attention throughout the day. However, it was clear from the conversations that this was the main benefit ICT brought them in terms of flexibility and productivity. Smartphones, laptops, cloud-computing and quasi-ubiquitous connectivity combine to produce an almost seamless work environment regardless of where the person finds themselves. Cloud-computing, specifically cloud-based storage services such as Dropbox or Google Drive, mean that each person has access to the same files as on their desktop at the workplace as on their tablet, laptop or smartphone anywhere they can get an Internet connection. Calendars and other resources can also be replicated across various devices using the same cloud-based services. The fact that work can be performed offline and remain synchronized (updates are performed once a network connection is available) means that there is further flexibility in where and when interviewees can work.

I have Google Drive and I love it. I think I've been maintaining this like hierarchy of folders for like, I don't know, like 10 years or something like that and I'd be like changing it over and over. It's amazing. Every single aspect of my life is on this Google Drive in various different folders. (Interviewee #16)

Yeah, yeah, I also use Dropbox on my iPhone. So for instance, before I teach a class, I use my iPhone to check the slides, to make sure everything is fine. Yeah, so I check the slides on my iPhone. Yeah, yeah ... (Interviewee #18)

So... And I'm using Dropbox, so I always have all my folders that I have at the office, I always have them at work. So it's really not an issue for me to work either at home or at the office. I have access to the exact same information. (Interviewee #19)

Yes, I mean I'm using Dropbox all the time, so for folders, it's the same. Like let's say today I'm working on a paper, I'm going to make modifications to it, I'm going to start working on the response letter. To the editor. Well, if tomorrow I decide to work at home, I know that I have access to Dropbox, and I have the latest edits. (Interviewee #19)

But I mean it's because I have a laptop with me where I am. As I said, Dropbox has made a huge difference in my life. Because I use to call her like, okay could you go in my office. Log on. Files should be there and can you email it to me. Now with Dropbox I can. So she's probably very happy. (Interviewee #20)

And what's, probably the smartphone is nice because for a while I had the calendar. I forgot I'm using that a lot and the fact it's synchronises, it's wonderful and I can make appointments and everything is. (Interviewee #20)

On top of cloud-based solutions allowing access to the same files, some interviewees mentioned other solutions replicating their work environment at home using tools such as a virtual private network (VPN) or simply ensuring the same software is available in both places.

So for what I have access to the same thing, as well I've been setting on... Both my computers have the same software, so for statistics for instance, I'm going to have [inaudible] SPSS on both computers. So I have access to the same thing. And that has been set up by the McGill IT department here. So they put the same thing. The exact same software on my laptop and on my desktop, so... (Interviewee #19)

It's like in terms of technology, it really isn't a big deal. It's like my laptop, I'm happy with my laptop. And it's just at home you can work with your pyjamas. I guess that will be the only difference. Otherwise it's like it's the same work. Being at home doesn't affect me negatively or being here at work doesn't affect me negatively. I can do the same work. And also I use Team Viewer so I can do remote access. So even if I'm at home and if I have to use data stream, I can actually remotely access my desktop and then run data stream. Although my desktop doesn't log efficiently every single time, but still. (Interviewee #21)

Interviewee #18 also use the VPN provided by McGill to reproduce his office computing environment at home, however he uses Microsoft's Remote Desktop instead of Team Viewer. As we saw earlier in 'Affordance paradox', this would not always run smoothly and was perceived as a hindrance for working at home. Interviewee #17 uses the McGill VPN for a more limited use of simply connecting to the network drives at the office. Although the home office can be replicated even further afield as mentioned by Interviewees #17 and #21.

Yes, no I appreciate technology. I love technology, that's one thing. And another thing is in terms of my work for instance from January 9 until February 9 I was able to spend one month in Turkey. That, I mean it wasn't vacation. I was still there working thanks to technology. It did not affect my work here at McGill, because as I said I had remote desktop, I had my laptop and as long as you have Wi-Fi you can have access to anything. I had VPN, which means I was also able to access to McGill library resources. So without technology I wouldn't be able to do that. So in that sense I am very appreciative of technology. If I feel under weather I can stay at home. I don't have to like come to office at 9 a.m. like many other jobs require. And then in fact technology allows us to do that. I mean one part is the nature of the profession that we're in and the other part is the technology. I do accounting research, so I don't need a lab. All I need is my laptop and everything is online, so without that it will be difficult to do my work. (Interviewee #21)

Although smartphones and other mobile devices such as tablets can in theory replicate the office environment in terms of making files and resources available, the limits of the ergonomics, as seen in Affordance paradox, doesn't make this practical. However, certain shorter tasks, such as reading and replying to emails, are feasibly done on a commute to and from work in public transit thanks to mobile Internet as interviewee #20 explains:

I don't need the latest version but, now that I have a smartphone. I take care of lots of emails. I decided not to have a car anymore, so I use the public transport. So often I take care of emails on the go with that. So that's a tool. (Interviewee #20)

Like taking care of emails, I do it a lot on my smartphone, which is different than it used to. And I like it because there's lots of, like basic things that I can take care of during time that anyhow I'm in transit so it's. I don't feel I am losing time. (Interviewee #20)

In some instances, while travelling farther afield where roaming charges can be prohibitive, getting an Internet connection requires some extra effort:

Yes, which usually in hotels is okay, because we have always... Like if a Wi-Fi connection is not great, which happens, they always have an Ethernet cable. So and then that's fast. So it's not a problem. (Interviewee #19)

At the airport, yes. If I... I think there were a couple times I had really... I had to connect the internet to something urgently. And at that time the airport didn't provide free Wi-Fi, so I had to buy the hotspot, that kind of thing. Like a couple... Few dollars per hour. Yes. (Interviewee #23)

What is interesting is that McGill is ready to pay for their academic staff's Internet connections at home:

Yes, it actually is a super-fast Wi-Fi connection at home, because I am streaming a lot of videos, so my TV, like on my laptop and my TV. So I actually get fast as possible Wi-Fi connection. McGill would technically pay for it, like I have a possibility to have McGill pay for my internet connection at home, I'm just paying for myself because I'm using the McGill money for... My budget for other things. But it's the same. No difference. (Interviewee #19)

As seen in 'Affordance paradox', Interviewee #23 points out that working across space and time isn't yet as seamless as it could be ideally:

A: So the only thing I am sort of wish I... I think we'll probably get there in a few years, but now I have to install the software on my laptop and desktop. So that I can use the same software. Regardless of which device I'm using. But if it's all like Cloud-

based, which is accessible from any device, then actually it really... Your... The way you work will not be affected by where you are, right? So that's kind of the ideal situation I'm kind of envisioning. I think really we are getting there, yes.

Q: Okay, so seamless...

A: Yes, seamless connection, yes, in both... In terms of both the software, data, and also the connection. Because still we have limited connection, right? You have to be in the hotspot to be able to get connection. So if you have like public... Free public Wi-Fi everywhere, then it's really seamless.

#### *4.2.1.1.3.2 Ease of sharing files with others*

Another perceived benefit of ICT expressed by the interviewees is the easy sharing of files with collaborators. Interviewees #16 and #17 use cloud-based sharing solutions such as Google Drive or Dropbox to collaborate on research or teaching:

Although when I have research assistants or when I have teaching assistants I share with them like the specific folder where I keep my slides or whatever material and then I have them upload new documents and things like that. (Interviewee #16)

In the case of interviewee #22, it is the convenience of being able to correct exam papers with the help of his wife on two iPad tablets where one would read the exam and evaluate while calling out the grading while the other would enter it on a grading key on the other iPad. Although this is collaboration in person – not taking advantage of the benefits of working at a distance with one's collaborators – it was perceived by this professor as being a major productivity enhancement over more traditional methods.

#### *4.2.1.1.3.3 Working Paperless*

Although, as part of the Affordance paradox described above, interviewees expressed their attachment to paper and printing, a few were still cognizant of the benefits of going either partly paperless or completely paperless. In the case of interviewee #20, the advantage of going paperless is specifically to maintain the feeling that no information is lost and that any document can be recovered at any moment in time in the future. She perceived it as also an advantage in terms of freeing up space in her office since there is less of a need to store paper. For interviewees #16 and #22, going paperless appears to have more of an ideological purpose behind it:

I never print... no, I usually don't print. I don't see the point. (Interviewee #16)

Q: And do you... In terms of printing requirements, what... Do you use... I mean, you were mentioning...

A: I'm trying to do as little as I can. So I'm PDFing a lot of things to keep. And then most of the printing I do is on my own printer or here, but it's when I absolutely have to.

Q: Okay. All right.

A: I transfer... Instead of doing a printout, I often transfer stuff to my iPad to check and to proofread and things like this. So I'm using my iPad as a piece of paper.

Q: Okay. How's that working out? Is it...?

A: Amazing well, in fact, I have to say. Like I mean... But you have to PDF your files to do this. And it's one of the main reasons why I PDF most of everything I do. Because transferring it to the iPad is seamless. Transferring Word files to the iPad is not perfect. There's still some pain in the neck with PDFing files, sometimes where you end up with six or seven or eight different files with tables and stuff like this. But I would say that most of my acquisition of knowledge, which is really to reading, I do on my iPad today. Like I mean, if I go to a seminar, I don't print the paper. I'm using this on my iPad. This is what I carry with me. Even though I have an iPad one. Still have my old iPad one. (Interviewee #22)

Q: Okay, interesting. Coming back to the research side, how much would you say in terms of proportion... I mean, do you ever print now, any papers, or that's it? You've gone down to... Okay.

A: If I print it I lose it, or I keep printing it, and it's... Like what I'm tending to do, if I work on research, I PDF paper, I have them on my iPad, and I work on the screen. So that's how I'm... My iPad replaces paper as much as I can make it happen. (Interviewee #22)

Q: Okay. Anything else?

A: Well, I'm dreaming of my textbook.

Q: Okay, yes?

A: I don't use this, they've just sent them to me. Whenever I'm using something, I'm asking to get a copy. To put on my iPad. Because I have all of them with me.

Q: Okay.

A: Where I'm going. So that's important for me. In the same way as I'm saying that I'm doing my knowledge acquisition through my iPad. That's truly what I mean. So that's an important tool for me to do this. So I don't think we should have any of these things on the shelves.

Q: Okay, that's interesting. (Interviewee #22)

#### 4.2.1.1.4 The Body

Ergonomic issues emerged as an important sub-category within 'Affordance paradox' and this is a key aspect of the relationship between the human body and devices in the daily practices of academics. However, this relationship emerges in other, often subtler,



ways, not directly dealing with the interaction between the user and device. This relationship appears more embedded in the body and mind, as sort of automatism or reflexes. This category, 'The body' emerged in the exploratory phase, but yielded three new sub-categories in the intensive phase: Attention, Intimate bodily relationship with ICT and Addiction. References coded in sub-categories from the exploratory phase, 'Clothing which puts you in a working mood' and 'The body and space', were recoded either into the new sub-categories or the other categories developed in the intensive phase. References from another category from the exploratory phase, 'Distractions' and its subcategory, 'Procrastination', were also recoded either into the new sub-categories under 'The body' or the other categories developed in the intensive phase. Included in the recoding were all references from the exploratory phase. The relic subcategories from the exploratory phase were then discarded as they were redundant with the new sub-categories.

As mentioned above, ergonomics is clearly apparent as a factor in shaping the daily work practices of those interviewed at McGill. Given the conversation was centered on the use of technology, many of the factors raised could be categorized under human-computer interaction as this following extract indicates,

Q: Are there any specific things that you would prefer doing at home than in the office or vice versa?

A: For programming, sometime I need to write some codes, computational code and for that kind of job I prefer to do it in the office because the screen is bigger and the computational power is stronger. (Interviewee #18)

As seen in the other categories such as 'Affordance paradox', the size of screens and of mobile devices are important factors in how users perceive their usability in various environments. However, a purely HCI interpretation would be a reductionist approach given that these considerations are not uniquely related to the point of interaction between users and devices, but extends into the relationship users have with the technology even when not interacting with them at a functional level.

As seen earlier, interviewees struggle with distractions at work and at home. Whether they involve noisy environments or notifications on their smartphones, ensuring uninterrupted concentration on the task at hand is of great importance to the interviewees:

While when I'm home I guess that it comes to mind that I could watch a good TV series or read a novel or do things that would be more enjoyable. (Interviewee #20)

I really need to be in my zone without any distractions. And I find again at the office I'm in... Almost like in a bubble. Like there's really nothing happening, I'm not distracted. So I guess, you know, most people would say the opposite, they get distracted at the office, but that's... For me, I am actually less distracted at the office. (Interviewee #19)

Well as I was saying at the beginning, it gets kind of captured attention. There's nothing here. I have my music, but that's it. Like there's no phone ringing, there is no TV, there is no food. There's no break really possible. That's the first thing. (Interviewees #19)

(...) but if I can I'm trying to come to the office because I feel like I have much fewer distractions. Like I have to work, like there's nothing else I can do. Like at home I can do different things. (Interviewee #19)

Interviewee #19 finds the office environment to be conducive to concentration on tasks requiring it. She uses the terms 'captured attention' and 'bubble', which seems to be what interviewees seek to regulate by having a certain control of their environment. How technology helps or hinders the management of 'captured attention' is an issue frequently raised in the interviews:

Academic life is like that, as you probably know. It's not something you can like shut off and then come back tomorrow. It's... You think about your research all the time, your teaching all the time. But with the help of technology actually, that tendency actually becomes stronger, I think. (Interviewee #23)

Yes, I have an iPhone 6 plus where I check my emails, but I turn it off at night. I like... I hate the idea of like my phone... so if I have a new email that arrives I need to read it instantly and so that's actually why... I mean I need to like know what's happening and then I'm going to start thinking about it and I'm going to start like... I'm going to think, okay well I need to answer it now. And usually when it's a student or something I'm almost answering instantly because I'm thinking, okay well let's just get it done. I have a zero unread mailbox policy, so I never... I mean when I have an unread email it really bothers me, so I'm keeping them for that purpose, like I have the review to do and I keep this unread email, so I have like three unread emails right now in my mailbox and it really pisses me off. So, like I'm just going to be happy when it's done, but I'm keeping them like that because I want to keep track of what are the ongoing tasks, you know, that I need to do. (Interviewee #16)

And it's like always like you receive so many alerts, like I'm trying to disable like all the alerts I can like from Facebook and things like that, because they try to alert you when anything is happening, then you want to look at it and it just takes you out of what you were doing, you know. So like Facebook is the first one, like

there's oh, new alert, someone likes your post. You're like I don't give a shit. Like you know, it's great but I can look at it tomorrow or I can look at it today or whatever tonight. (Interviewee #16)

We see in the extracts above; the implicit pull of technology affects where the interviewees' attention gets directed even when away from their desks and not using their devices. As we saw in the exploratory phase, some interviewees sought to put a physical distance between themselves and their devices in order to not feel this pull. Interviewee #8 for example would put his smartphone at the bottom of his bag so that he would not see it and be distracted by its pull. This pull of technology – or perceived quasi-permanent connection with it – reveals an intimate relationship between the body and devices:

So I guess my point is like when I go to bed at night and just turn it off so that I don't have to like wake up in the night and say, okay well what's happening. Am I receiving emails from students or from other professors or something? I really don't want to be in that mindset at night, so. That's also probably why I will not buy an Apple watch, because I do not need more to be more connected. I think I'm connected enough. (Interviewee #16)

if you really want to be focused on one thing you just turn it off. I don't think you can be very productive with like an iPhone on your lap. (Interviewee #16)

Interviewee #16 likens his smartphone to a wearable accessory not only having a very close contact with the body, by also establishing an intimate connection with an awareness of its availability – of it being at hand. Interviewee #23 also describes how he feels like always putting his smartphone in his pocket wherever he goes so that he doesn't lose that connection. This, he says, is a reflex and does it without thinking about it. This reflex is put into sharp focus with his habit of not taking his smartphone with him to class when teaching

Q: Okay. And how do you feel about that, when you're without your smart phone in class and...?

A: Because I'm teaching, right, I don't even like recognise it during... While I'm teaching.

Q: Okay.

A: And because I've been doing that for several years. It became my routine. So I don't even like almost think about it. I just put it on my desk and then go to classroom, and then come back. And then... Yes. (Interviewee #23)

Although Interviewee #23 leaves his smartphone on his desk when going to class, his body's relationship to it remains as intimate as when he puts it in his pocket since it is

described as an automatism internalized by the body. He doesn't 'think about it'. This automatic awareness of the location of devices and their perception of being at hand is further revealed by interviewee #22 when discussing the advantages, he feels inherent to working with digital documents instead of paper ones: "If it's in my computer, I know it's there. If it's on my desk somewhere, I don't know where it is" and "That goes in a box, because otherwise where the hell is it?" Figures 12 to 16 show how academics at McGill keep their smartphone ready at hand when at their desks. The devices are magnified and circled in red.



Figure 12 - Office of interviewee #21 with mobile magnified (Author)



Figure 13 - Office of interviewee #18 with mobile magnified (Author)



Figure 14 - Office of interviewee #23 with mobile magnified (Author)



Figure 15 - Office of interviewee #20 with mobile magnified (Author)



Figure 16 - Office of interviewee #16 with mobile magnified (Author)

Another manifestation of the intimate relationship between technology and interviewees' bodies is addiction. As already seen under 'Affordance paradox', interviewee #23 has complained about how his smartphone – while recognizing it as a practical device – has turned him into a sort of addict, checking his emails continuously even when he doesn't feel he needs to. He suggests the establishment of a temporary physical distance from the device as a possible way of overcoming the addiction. However, he doesn't feel he has been able to kick the habit. He says of this, "That's a sign of addiction I think". As mentioned earlier in 'Affordance paradox', the struggle against this tendency of getting hooked on technology and the distractions of the Internet are also apparent in the experience of interviewee #21:

It's like I need to be disconnected time to time. It's like it's not that I'm being on the Internet, it's not like I'm reading scientific papers all the time. I read tabloids. It's like Yahoo.com and then the stupid news. So it's sometimes it's like if I force myself not to have that kind of access, it's good, it's beneficial

If there's Wi-Fi, yes. Here's the thing, sometimes I actually deliberately look for a coffee shop that doesn't offer free Wi-Fi, because that will force me to read my papers. If I have Wi-Fi I'm going to check my email and then few minutes I'm going to check newspapers and then suddenly end up watching cat videos on YouTube. So that's why sometimes I actually force myself to go to coffee shops where there's no free Wi-Fi. I'll just read my papers.

Q: Okay, alright and is that the same going to the park is the same idea as to get away from the connectivity and the distractions let's say.

A: Slash fresh air, yes.

The relationship between technology and the body emerges in a subtler, yet direct, fashion. As observed under the category of 'Affordance paradox', the materiality of technological devices, such as laptops and tablets, are experienced as direct solicitations on the body when not interacting with them in any functional manner. Weight, bulkiness, texture, etc. are all factors shaping how interviewees relate to technology daily. Interviewee #19 has expressed regret of laptops being heavy and bulky, making it impractical and unpleasant to travel with. She cited the case of airport security and the hassle of repeatedly removing the device from her bag for inspection. Interviewee #18 implies the weight and bulkiness of his laptop discourage him from transporting it with him when commuting from the home to the office: I never carry it to my office, because my home is very close to the office. Interviewee #22, describes his laptop as a heavy and bulky weight on his back, "Well I used to carry my laptop on my back" and very

impractical for use on the move, “In the end it’s not convenient, you don’t want to take that out to just check if you’ve received an email. So, it was too big for that.” He found the solution in the tablet, “So that I don’t have to carry my computer”, which was much more practical for use on the move, “Pressing the button and it’s on, and pressing the button it’s off”. However, he still finds the lack of a keyboard on the tablet to be inconvenient – a feeling shared by his colleagues. He would like to find a solution such that he retains the “notion that I have something in my hand just to read” while being able to use a keyboard that isn’t attached in any way to the device. Again, the intimate relationship between the body of interviewee #22 and his tablet was revealed by his expression of attachment – physically established through his fingers:

I mean, I’ve got stuff at the tip of my finger. I’ve got almost everything that I need. And when I don’t have it, it’s a pain in the neck. I’m not used to this anymore. It’s not something I really like.

Interviewee #22 also expressed frustration with having to still deal with cables for transferring files from his tablet to his computer – another perceived physical barrier soliciting his body.

More indirect relationships can be gleaned from the transcripts linking the body with ICT. The fact that technology allows interviewees to work from home has developed certain associations between the clothing they wear in the privacy of their homes and work – both positive and negative. Interviewee #21 finds it practical to be able to choose to work at home because “it’s just at home you can work with your pajamas”, whereas interviewee #16 has the opposite impression: “I cannot really enjoy myself if I’m like, you know, in my pajamas and grading papers. I hate that.”

It is also interesting to contrast the intimate relationship interviewees hold with paper – one of the reasons for their continued attachment to this medium despite the alternatives offered by ICT. “I like to hold the paper in hand, and it’s also easier to read the paper on a hardcopy” says interviewee #18 when asked why he would not use a tablet instead of paper when reading and annotating documents. The materiality of paper is completely different when framed as the experience interviewees have when engaging in daily practices such as reading and annotating papers. When asked what she felt was better with working on paper, interviewee #19 said “Like my pen and



highlighting in colors and things like that. So... If I need to work on a paper, I usually print." The sensual experience of paper – touch, sight and perhaps even sound and smell – seems to be of importance for interviewees. "I have to concentrate, and I have to, you know, sometimes make notes. So, for that purpose I think the printout works a lot better. So..." (Interviewee #23).

Interviewee #21 related the convenience of being able to print in her office to gaining weight and losing out on social contact when getting up:

I get up and I go to that room. If I have my printer there, I'll always use it. So that's why I know myself, so that's why I don't buy that damn printer so that I don't have to use that printer in my office (Interviewee #21)

Interviewee #19 found that the convenience of being able to work from home thanks to ICT as of being of particular importance because of her pregnancy and the added risk of falling due to the harsh winter climate of Montreal. She describes this risk as impacting her decision of working at home or in the office:

A: You know, so that's nice as well. I need to take a break from time to time, it happens to me as well, and I'm doing that more and more now that I'm pregnant. I'm doing the morning here, like up to two and three, and then I go home and I finish the day with more manual tasks. Like easy task at home. So it's split a little bit and it's less tiring. But yes. I mean, [inaudible] as well we're in Montreal, so depending on the weather, that is going to impact my decision to come to the office or not. Right, there were some days in January that were just horrible, completely icy. And again being pregnant I was like, I'm not working, I'm working to the office. I'm not working by this weather, I might just fall and... So no good.

Q: Yes. And I suppose... So then you stay at home and you work from...

A: From home.

Q: From home, okay.

The sub-category 'Intimate bodily' relationships was further sub-divided into sub-categories of 'Direct', 'Indirect', and 'Compared to paper' for the purposes of clarity.

The remaining categories generated in this intensive phase for the case of McGill were: Place as a mindset, Generating stress, Time zones, Isolation bubble, Copresence, Privacy or not disturbing others, Freedom from connectivity, Teaching duties, Mess, Administrative collaboration, Anytime, Attachment to place, Data Security, Heavily dependent on technology for research, Seamless, Loneliness, Looking professional, Minimal ICT Requirements for Job, and Third Spaces. These categories remained and

were left as is for the coding of the intensive phase apart for Printing & Paper, which was recoded with the exploratory data into the new categories generated in the intensive phase (ICT Affordances, Habits & Routines, Affordance paradox, and ICT Affordances) and deleted.

The references in the category 'Using technology every day', generated during the exploratory phase, were recoded into the new category structure and deleted. This prompted the creation of a new sub-category in ICT Affordances; 'Coordinating physical movement'.

The last step in completing the coding for the McGill case, instead of recoding the original transcripts with the new categories, all the references in the existing categories from the exploratory phase were recoded using these new categories. During this process, a new sub-category, 'Compared to other humans', was added under the sub-category of 'Intimate bodily relationships' under 'The body'.

#### **4.2.1.2 Analysis**

The structure resulting from the coding of all the collected data for the McGill Desautels site is found in Figure 17. This chart was generated using functionalities available in the NVivo software. The size of each of the blocks reflects the number of references contained in each of the corresponding categories. Using the matrix coding feature in NVivo, the relationships between each of the blocks was explored. The relationships could be explored between pairs or sets of blocks. To identify those relationships of greatest interest, a matrix of all blocks was generated. The resulting table is unfortunately too large to be put in the appendices. Based on this table, other matrices were generated to explore in more detail the relationships between each of the categories corresponding to a cell in the matrix or sets of categories of interest using another matrix query. The full conceptual picture of what emerges from this exercise is represented in Figure 18. It is the conceptual model of the relationship between affordance and the daily practices of academics in organizing their workaday, with a focus on ICT and space.

Naturally, the core category of this model is ‘Organizing the workaday in time and space’, with a total of 182 references, given it is the practice upon which the investigation is focused. This category is causally related to other categories as presented in Figure 18. Each of these causal relationships will now be explained in detail.

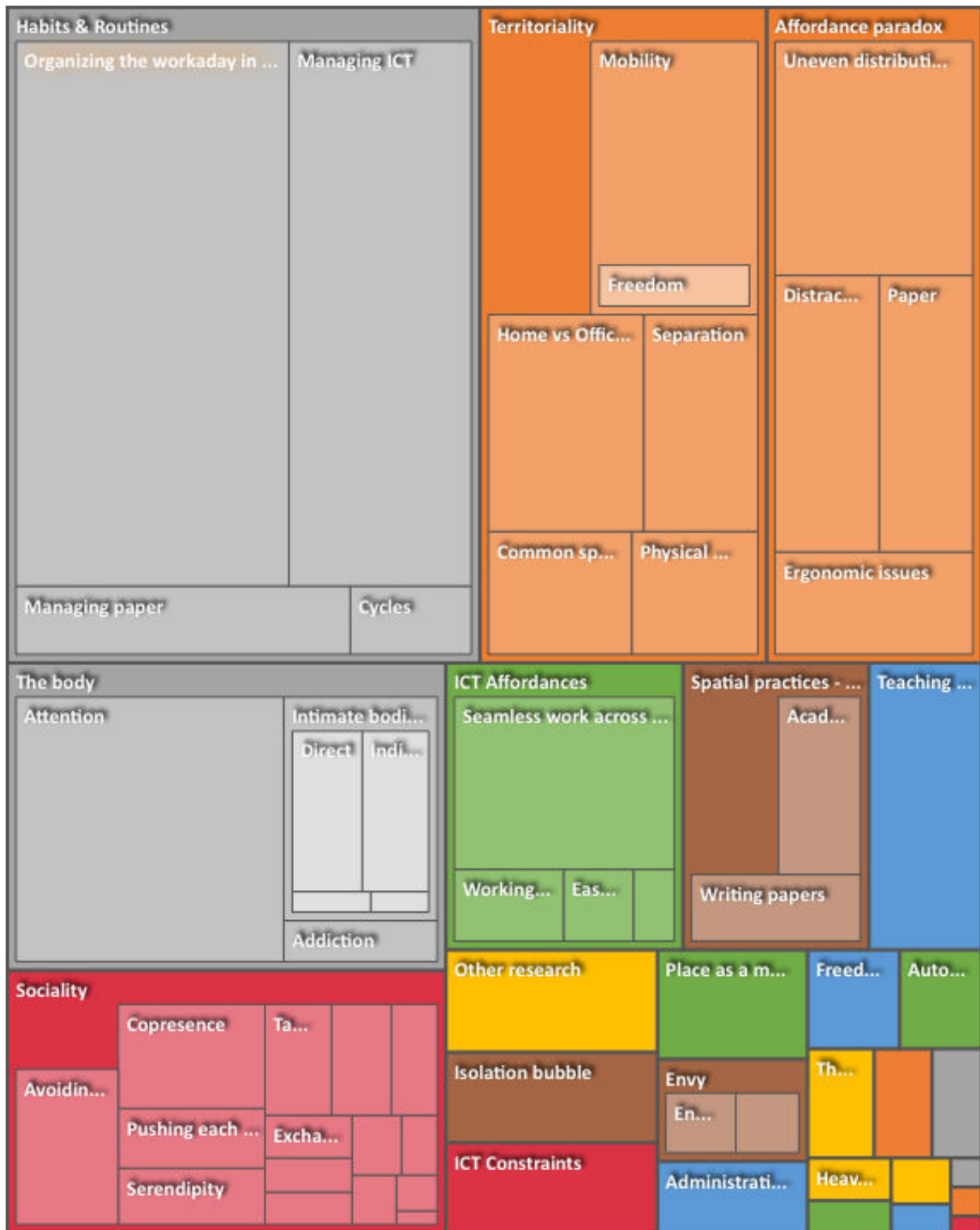


Figure 17- Coding chart for Intensive Phase at McGill (Author)

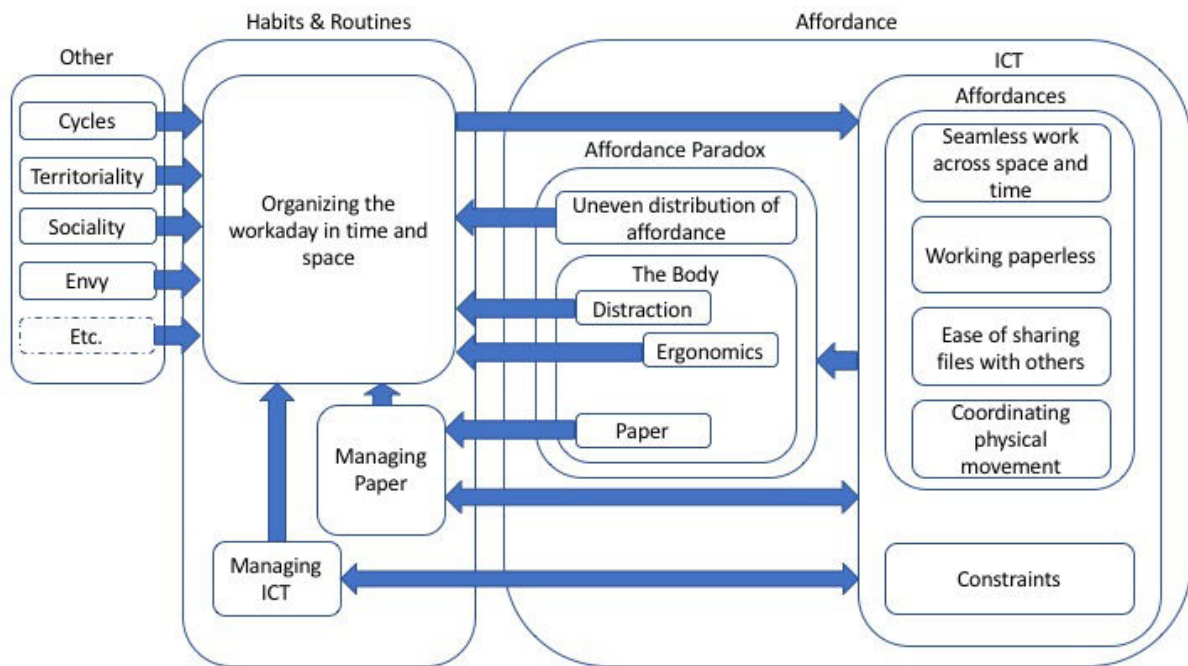


Figure 18 – Coding structure for the Intensive Phase at McGill (Author)

#### 4.2.1.2.1 Overall picture

Academics, whether focused on their teaching, administrative or research activities, see their environment as affording (or facilitating) different modes of attention. They seek to exert some level of influence or control on this affordance in their environment. This is partly why activities in higher education are traditionally organized in space in specific ways – auditoriums for lectures or individual offices for research or tutoring. Although the traditional practice of teaching has specific spatial constraints, given it usually involves many individuals, research activities are different. Academic researchers have a certain freedom – like some other knowledge workers – in choosing where they work. The data reveals academics in business schools as highly dependent on ICT to fulfill their duties. There seems to be a certain segmentation of space as a function of what can be afforded by the combination of environment and ICT. For example, commutes on public transit are considered productive periods for certain tasks – not others – with smartphones. Tablets on flights or third-spaces (with no connectivity) for reading, laptops or desktops at home, desktops with big screens and high-capacity printing at the office, all synchronized using cloud-based solutions, are other examples. Ideally seamless, but not actually the case as revealed by the data. Furthermore, smartphones during ambiguous periods such as personal time at home, at

the gym or any other place where work isn't planned or expected, is considered both practical and distractive or disruptive.

The interviews with the academics systematically started with a description of how they organized their work in time and space. As the interviewees explained their organization of the workaday, various factors affecting specific decisions on where and when they would work were revealed. The relatively open-ended nature of the interviews yielded many categories of this type. These include family constraints, feelings of envy or autonomy, territoriality or sociality. However, other categories were concerned with more material aspects of their environment, such as distance between the home and the office or noise.

The intimate relationship between the body (with its existing habits) and ICT as inserted in the environment produce an affordance paradox which has an impact on the body and hence existing habits. The affordance paradox operates at the level of distraction and ergonomics.

#### 4.2.1.2.2 Cycles -> Organizing the workaday in time and space

Daily, weekly and seasonal cycles were very important factors in how academics would organize their work. Student lunch breaks, taking one's daughter to school or traffic patterns on the roads were all cited as reasons by academics for organizing their workaday in specific ways. The Facilities Manager of Desautels would even schedule meetings in such a way as to avoid elevator traffic between classes. The weekend is seen as an important break from the office environment by some, however others are tempted to take advantage of the quieter atmosphere to pop into the office on Saturday or Sunday. Seasons – both climatic and professional – were also seen as opportunities for changes in organizing work in space and time. Summer and clement weather would provide the opportunity to take breaks from the office environment or even take work to a third space like a café or a park. Cold winter weather would be a chance to take a shorter break to 'disconnect'. The snowy and very cold winters of Montreal provide a particularly bracing and invigorating environment for such breaks. Conferences are also seen by academics as implying changes in the way they organize themselves in space

and time. This includes how they work while travelling long distances on flights and when staying in hotels.

#### 4.2.1.2.3 Territoriality -> Organizing the workaday in time and space

'Territoriality' includes its subcategories, 'Common spaces', 'Home vs Office for work', 'Mobility', 'Freedom', 'Physical barriers', and 'Separation'. All of these are factors in determining how academics organize their workaday in space and time.

'Territoriality' shows how academics are keen to maintain a designated workspace that they can call their own. All interviewees expressed skepticism or even hostility towards the idea of trading in their closed offices for open spaces. This manifested itself especially when asked about whether they would accept having their workspace organized as an open space like in the corporate world. Others would also express skepticism regarding the use of common spaces such as libraries on campus "because that's a space for students mostly" (Interviewee #23). However, this attachment would manifest itself most intensely when academics are deprived of their designated offices due to renovations or other building projects when they are forced to relocate. According to the Facilities Manager at McGill, academics were palpably perturbed by the obligation to abandon their space and become nomads during a renovation project that lasted for a year. They were very emotionally attached to their old offices and were very keen to secure what they felt would be the best office in the new office space. In general, this attachment would imply that academics felt they needed to defend their 'territory' on a regular basis by making their presence known – by ensuring a certain physical presence from time to time for example – or jockey for new office space when they are obliged to.

The way common spaces were perceived would also influence how academics would organize their workaday. As can be seen in the broad category 'Sociality', most academics would see common spaces as places to escape the loneliness of the closed office and have some social contact with colleagues and others. On the other hand, some would avoid common spaces – sometimes at great lengths – to avoid others altogether. Controlled access, such as electronic badges, to these spaces were viewed as

discouraging the use of these spaces for casual social contact. Others complained about the atmosphere of common spaces which they also felt would discourage their use.

All the academics appreciated the feeling of being in command of the choice of working from home or at the office. Occasionally, they would choose a third space. In general, this feeling of being autonomous and free of constraint in terms of physical presence in one location or another was widely shared. However, how this feeling would translate into actual habits and routines would vary quite a bit. There were two attitudes: one would be to develop a strict separation between home and office in terms of work (work would never be done at home) and the other would be to use both home and office for work in some sort of flexible arrangement. This separation would occasionally be enforced by separating electronically the home and the office by using separate devices for each such that there would not be any mixing of tasks.

Another interesting aspect of territoriality with regards to the specific case of the business school that is the McGill Desautels Faculty of Management is the perception of its 'seperateness' from the rest of the campus and university. Not only is it physically separate by being completely self-contained in its own building, but it is also perceived as being a different organization with values which differ from the other faculties.

The Desautels Faculty of Management Bronfman Building is situated on part of the campus most open to the downtown business core of the city of Montreal. Taking a break for lunch at various sandwich shops or cafés nearby with office workers is routine. The Faculty gives the feeling of being integrated into the business community of Montreal, which is part of their marketing strategy.

#### 4.2.1.2.4 Sociality -> Organizing the workaday in time and space

One of the biggest reasons cited by academics for working at the office on a regular basis is social contact. This is above and beyond obligations of presence – whether it be for administrative, teaching or research tasks. The perceived benefits are many and varied.

All interviewees felt the need to be around people – whether students or colleagues – on a regular basis. Most cited having company for breaks as being a desirable aspect of working at the office. Others cited the fact of being in the presence of others would push them into a ‘working mood’. In one case, it didn’t matter whether this meant going to the office or to a crowded café – just as long as people were around. The unanimity of the feeling of the importance of being in the company of others on a regular basis is clearly put forward by how some will complain about being distracted by the presence of others, and yet prefer the company of others rather than working in solitude at home. Fear of loneliness would also push many to seek social contact in the workplace. This feeling is closely related to the feeling of freedom to avoid social contact. The feeling of being in control of where and when one would work fostered a valuing of regular social contact. Electronic sociality – being in contact with others via social media, mobile telephony or email – is also a driving factor in how academics organized their workaday in time and space. Many interviewees would decide on where they would work based on how easy it would be to stay in touch via the Internet or the mobile phone. At times this contact would be sought after, at others avoided. Again, the freedom to choose was seen as very important.

On top of the need to be in the presence of others and within an atmosphere of professional activity, the perception of serendipitous encounters is important. The only places these were seen as being possible were at the office and during conferences. Being able to exchange ideas with peers and building working relationships was seen as being possible with in-person encounters. Electronic contact is seen as being too limited to establish key contacts and deeper intellectual exchanges. This perceived need was seen as a good reason to show up for work at the office on a regular basis.

For many of the academics – professors in particular – having a regular presence in the office would be in the service of the broader objective of looking professional. Prolonged absences were feared to signal to others a lack of engagement or motivation. A regular physical presence also helps nurture relationships with colleagues upon whom one is dependent for helping with certain tasks. Access to colleagues ensures access to a support network for facing up to difficulties or tasks requiring help. A regular presence



in the office and partaking in certain social events or taking up of administrative tasks would partly address these concerns.

Away from the office, attending conferences and regular team retreats are also considered to be important for the exchange of ideas and building of relationships. Conferences, occurring at specific times of the year, would be opportunities for the building and nurturing of professional relationships. These relationships would be maintained the rest of the year with the help of electronic communications and other collaborative tools. Team retreats would be organized for researchers working on a specific project to extract themselves from the office environment to spend time together and build a sense of community.

Occasionally, the tendency to avoid being in the presence of others is driven by a certain saturation of physical space. As mentioned earlier, the Facilities Manager at Desautels spoke of avoiding the hallways and elevators at certain times of the day to not have to wait longer than necessary or get delayed by crowds in common spaces.

#### 4.2.1.2.5 Etc -> Organizing the workaday in time and space

Many other factors influencing where and when academics work emerge from the data. Although territoriality, sociality and cycles were those factors having been cited the most frequently, the following were of note as well.

Envy of business schools or of other business schools (the competition) was seen as a factor in determining who ended up working where. Some of the PhD students working in offices at the Desautels Faculty of Management at McGill were in fact affiliated with other faculties of the University. All of these 'guest' researchers managed to obtain office spaces through contacts within the Faculty of Management. These researchers were all pushed to seeking such an arrangement because they felt the material conditions of their home faculties to be inadequate and that the Desautels Faculty of Management, being a well-funded business school, had the type of environment they aspired to. Envy of other business school also led some of the researchers at Desautels to go work in

other business schools such as HEC from time to time because the atmosphere there would feel more inspirational and friendlier.

A feeling the profession of academic conferred a special status of autonomy unlike most others was pervasive. This feeling generated an overall sense of freedom influencing decisions on how to organize the workaday. Academics interviewed would express a certain satisfaction in exercising their freedom to decide where and when to work and would hence often point out instances demonstrating this freedom. Whether it was being able to work during a sabbatical from home, during a teaching break while staying with family in Turkey, or in a wood cabin in lake country to get away from the office frenzy, interviewees were keen to show the benefits of this inherent freedom. In fact, many would cite it as being one of the reasons they chose the profession in the first place. Technology is also cited as facilitating this freedom.

#### 4.2.1.2.6 ICT Affordances -> Affordances paradox -> Organizing the workaday in time and space

What the environment affords an academic will be a function of the academic's perception of this very same environment. This perception is anchored in the properties of the physical world, including the academic's body and ICT artefacts. When evoking the affordances of ICT, academics are expressing how they see ICT objectively contributes to the physical characteristics of the environment and the expected effects. This is usually expressed in common parlance in terms such as 'ubiquitous computing' or 'going fully digital' (as opposed to working with paper). One interviewee spoke of going 'paperless', while another spoke of 'going digital' (implying 'ubiquitous computing'). On the other hand, constraints are characteristics of ICT leading to the limitation on an expected affordance. These can either be directly attributed to the technical characteristics of the technology, such as compatibility issues between operating systems (ex. Interviewee #16 complained that a classroom clicker app would not work on his iPhone), or due to social factors such as norms on when and where to use mobile phones, the risk of theft of devices in coffee shops (due to their perceived value), or simply the bulkiness of carrying a laptop around. Constraints, as they are recounted by the interviewees, are encountered through practice and are most often unexpected. The 'ICT Affordances'- 'Affordances paradox' nexus is a filtered perspective

on affordances perceived by academics in their environment, with a focus on ICT. This perspective answers the question of how the specificities of ICT combine with all other characteristics of an environment to produce affordances perceived by an academic going about their daily organization of activities in space and time. In this investigation, these specificities of ICT are limited to the expected perception, and not the spectrum of possibilities for affordance offered by ICT in an academic's environment. How these expected affordances interact with the environment (including the body) of the academic to produce an effective affordance perceived and acted on is the focus of the relationship between 'ICT Affordances' and 'Affordances paradox'. ICT Affordances produce a paradox once they are called upon in practice and combine with the other affordances in the environment. There are four types of ICT affordances identified in the data from the coding: Seamless work across space and time; Working paperless; Ease of sharing files with others; and, Coordinating physical movement. Emerging alongside these affordances are ICT Constraints. Each of these aspects of ICT affordance will now be described along with how each contributes to the affordance paradox. The relationship between the 'Affordance paradox' and how academics organize their workaday in time and space will then be described as it emerges from the evidence collected.

One of the most common expectations of ICT, as expressed by interviewees, is the possibility of working anywhere and anytime. 'Mobility' and 'seamless work' are two common expressions employed by a few interviewees, however the expectation was implicit throughout all the conversations. Their expectation is reasonable given the way ICT is portrayed and marketed, but also because the abstract possibilities offered by technology in terms of mobility and digitization are entirely feasible from a purely physical perspective. Widely available Internet connectivity – either through WiFi or 3G – mean that any portable wireless device is in theory mobile and can be used anywhere and at any time. The added advantages of digitization of documents (working paperless), cloud-computing and virtual private networks (VPN) make the expected affordance of working anywhere at any time appear achievable with very little effort. Whilst 'mobility', as used by interviewees, implies the use of devices when not in the office or at home, 'seamless' would be meant as the availability anywhere and at any time of the same working capabilities as in the office. Mobile use accepts limited

capabilities, however seamless would mean academics would be able to access and work with the same digital material and tools – with the equivalent full spectrum of features – as in the office. Although all the academics interviewed don't feel they have attained seamless work across space and time in this way, most aspired to making it happen. It is easy to see how this aspiration has come into being when one considers that identical applications such as email and word processors are available on tablet, smartphones, laptops and desktops alike. Combined with widely available Internet connectivity, it is easy to envisage having the office follow you everywhere you go in a purely functional sense. The evidence from the data suggests, however, that this ambition of working seamlessly across space and time is difficult to attain in practice.

There is, first, the issue of the uneven distribution of Internet connectivity or power outlets for laptops. For example, the Montreal metro is a 'dark spot' when it comes to 3G/cellular coverage and hence Internet is unavailable for academics using this mode of mass transit for their commutes. When available, quality of connectivity is also an issue. Speeds vary between the home and the office, and as would be expected, is usually slower and patchy when dependent on the 3G or cellular network. A further issue regarding connectivity is cost, especially when using a mobile Internet connection. Fees and rates are dependent on the amount of data transferred and this has implications for what academics choose to do on their devices when using them on the move or away from their home institutions.

Another is the fact that all software can't run everywhere and even if it can, it doesn't have the same features or capabilities available. For example, Microsoft Word on a Mac can integrate with bibliographic software such as Endnote, whereas the same isn't true for the version of Word for iOS (on an iPad for instance). In some cases, often for licensing reasons, academics don't have the same software installed on their home computers as they do at the office. Some get around this limitation by using a virtual desktop software allowing them to connect their home computer to the one at work and simulate the office desktop at home. However, this option requires the office computer to always be running and the remote desktop will almost always have a slower interface when compared to the office interface because of the latency presented by the remote connection.

Broadly speaking, when multiple devices are used, it is impossible to replicate the exact same electronic capabilities across space and time. Processing power, compatibility issues, different configurations on different devices, variations in speed, missing features between devices, etc. These factors have consequences on how academics organize their workaday as evidenced by the data collected.

Printing capabilities are a specific requirement for academics which is impossible – with the technology available currently – to replicate across space and time. Given the importance of printing for academics – despite the ability to work paperless – this requirement and the limitations presented by current technology mean that they must organize their workaday around this limitation. To replicate the capabilities of office printing in the home would require a high level of investment and ongoing expenses given the cost of printing high volumes of documents. Furthermore, office printing is highly preferred to printing at home or elsewhere because of the high capacity facilities available at the office. The office also provides suitable spaces for storing printed matter as was observed frequently in the academics' offices. Whilst seamless printing is not expected by academics, it is highly desired and could possibly change patterns of work should the technology allow it one day. In the meantime, printing seems to affect the organization of academics' workaday by pulling them towards the office – certainly for those who are still working regularly with paper.

Other reasons for the uneven distribution of affordance are related to social factors. Although it is quite possible for academics to work on a laptop in a café, the risk of theft renders this practice unfeasible. Academics perceive this practice as presenting too many constraints and inconveniences – for instance, having to take their belongings with them to the bathroom and eventually losing their place. In more confined spaces, such as public transport, privacy and other considerations such as not disturbing others could prevent academics from using their mobile devices for conversations. Peer pressure from friends or the family entourage could also limit when and where academics feel comfortable with using their devices. These social factors are important in how academics decide when and where they will use their devices.

Climate and weather are obvious factors also limiting the use of mobile devices outdoors. Montreal winters are too harsh to contemplate prolonged work with devices outdoors, including voice calls. Many interviewees, however, indicated they would compensate for this constraint by taking advantage as much as possible the pleasant summer weather in the green spaces of the city. Although ICT could in theory be used anywhere and anytime (any season), the combined affordance of the ICT and the rest of the environment in Montreal produce an uneven affordance for the use of ICT throughout the year. This is translated into habits and routines varying over the course of the year.

As suggested from the climatic constraint above, the body emerges as a key determinant for affordances. This is not only true for questions of comfort such as academics risking frostbite on their fingers in the Montreal winter, but also for questions of concentration. ICT inserts itself into the academic's environment already teeming with potential for distraction – colleagues and students in the office, the family at home and noise and movement anywhere between these two locations. As we have seen from the interviews, academics are in a constant struggle to balance what they perceive to be positive affordances – those leading to greater productivity – and negative ones. The greater reliance on ICT for both personal and professional life combined with the potential for being connected to the Internet always produces an environment even more richly populated with distractions for academics. Such is the level of distractive potential, academics find themselves developing strategies for managing their frequent urge to glance at their smartphone or watch a video on YouTube. This often leads to frustration because these urges are embodied reflexes developed over time with intensive use of devices. ICT, especially mobile devices, is designed to call upon one's attention as often as possible and to maintain engagement with the device as long as possible. Interviewees #8 and #21 provide perfect examples of frustrations and strategies for coping with distraction from ICT. Both expressed the difficulty of keeping their attention focused on work when the temptation to look at Facebook or YouTube was available. They would express it as a reflex – as if they would find themselves distracted by these websites without realizing it. It is as if the body was programmed to perform the keystrokes to switch from whatever work they were doing to the website or application that would be the subject of their temptation or pleasure. This could be seen as a

paradox of ICT affordance in the sense that while it affords academics increased productivity, it also affords distraction which can somewhat negate this increase in productivity. This distraction is managed by academics by employing strategies such as switching off devices, putting devices out of sight (such as the bottom of a bag), working in a location where an Internet connection is unavailable or disconnecting their device from a network connection. Another strategy is to work in an environment where the presence of others can act as a discouragement to allow oneself to get distracted – places such as the office or the library. These strategies have spatial dimensions, and some are purely based on changing work spaces. They all try to exert some control on the affordances the environment offers to the body.

The need to exert control on the affordance the environment offers the body is often best expressed in terms of ergonomics. Just as academics in Montreal avoid frostbite in the winter by limiting their work outdoors, they will also seek the most comfort when working with ICT in other ways. Architecture, interior design and ergonomics are concerned with how human bodies interact with their environment and maximizing comfort. For ICT, the field of human-computer interaction (HCI) is concerned with maximizing comfort in the design of devices and their interfaces. In the experience of academics, bodies pose limits on expected ICT affordances such as seamless work across space and time. For example, screen size, lack of a traditional physical keyboard and bulkiness discourage certain uses for mobile devices. Screen size is cited as the most important factor in choosing when and where to undertake certain types of work. A clear preference for large and multiple fixed screens in the office emerged from the interviews for all tasks, but especially those requiring a significant amount of concentration such as writing long text or coding. Writing – even short replies to emails – on a small device such as a smartphone isn't seen as ideal by most of the interviewees given the difficulty in typing text on small keyboards. Emails are read on the go such as on the commute and then replies are usually drafted once in the office or at home.

As already mentioned, another affordance paradox is paper. Despite the opportunity to work paperless, academics are still attached – quite literally – to paper. Paper offered a superior experience to what could be offered with ICT on a screen for many tasks. The materiality of paper carries weight for academics – they enjoy the texture, handling

documents and annotating by hand with colors to offer themselves a rich sensual experience. It also has a social legitimacy yet to be overtaken by the digital. Somewhat paradoxically, while providing the opportunity to work paperless, ICT also provides the opportunity to generate great amounts of printed matter. The sensual experience of paper is yet another reason why academics seem to feel the pull of the printers at the office.

The ease of sharing of files stems from the possibilities of Cloud-based storage. The practice of sharing files using cloud-based storage is widespread amongst academics. They perceive the use of these services as convenient since it saves them the hassle of sending bulky files by email and having to keep track of versions in the process. This possibility of ICT addresses in part the uneven distribution of good quality and inexpensive Internet connectivity when on the move. Should an academic wish to relay a document to a colleague without having to send a large attachment over a 3G connection, they can simply let the colleague know about the document being available on the shared cloud-based server and send them a link.

ICT – especially a combination of SMS, chat and social media applications – allow academics to easily coordinate their physical movements with each other during the day. They can plan coffee or lunch breaks or let each other know of who is lurking in the hallways. In this same vein, academics can also see if a person they wish to avoid is present in the building or away in a meeting to avoid them. This practice allows academics to somewhat control who they come across in the workplace and encounter only those they prefer contact with. This influences the experience of the workplace on a daily basis. Figures 19, 20 and 21 are photos of the hallways on the 5<sup>th</sup> floor of the Bronfman Building of the Desautels Faculty of Management where the academics' offices are located. They accurately reflect the atmosphere of the common areas of the floor where few members of the faculty are seen at all, let alone having conversations. These photos were taken in October 2014, well into the academic year, and would suggest very little social contact between members of the faculty in the common areas. This cannot be conclusively attributed to the practice of using ICT to avoid social contact – many academics expressed a desire for more of it – however, this can only support the idea



that social contact is increasingly online and that technology allows one to better control the social contact that happens in-person.



Figure 19 - Main reception area of the 5th floor of the Bronfman Building at McGill (Author)



Figure 20 - Main reception area of the 5th floor of the Bronfman Building at McGill (Author)



Figure 21 - Hallway giving access to faculty offices on 5th floor of the Bronfman Building at McGill (Author)

Figure 18 shows expected ICT affordances in a 'causal' relationship with the 'Affordance paradox'. However, the conceptual separation of 'ICT Affordances' from the paradoxes they generate is confusing. The reason why there is an affordance paradox is because of the opposition between the expected affordance of ICT and the perceived affordance in practice. The data suggests there is a subtle process where academics start with a new set of features, a new device or a new service with the assumption that they will afford them something new such as seamless work across space and time or working paperless. However, once these features, devices or services are used in practice, the perceived affordances no longer correspond to those initially expected. This is because the expected affordances are *a priori* to situated practice and combine with affordances in the environment to produce a perceived affordance at a given time. The environment also includes the body. The perception, therefore, of the affordance of ICT is no longer in isolation and therefore all other affordances in the environment come into play. Therefore, a laptop at home on the weekend and a laptop on the commute to work on a bus will not correspond to the same affordance for the practice of writing a paper or an email. The difference in affordance between the home and office environments can make the perceived affordance of ICT in each environment different. The resulting question

could be, how are affordances – all affordances offered by the environment – affected by ICT? However, for the purposes of understanding the relationship between ICT and affordances for academics, it is impossible to map the affordance for every possible combination of ICT and environment. It would also be a futile exercise given that this would lead to an infinite number of possibilities. However, as emerges from the data, we see there is a close relationship between certain aspects of the ICT and what affordances get perceived by academics. Academics seem to go through a process of moving from expected affordances to perceived affordances as they engage in practice daily. This is as valid for a desk or a chair as for a smartphone. How, therefore, are the daily practices of academics shaped by the perceived affordances strongly associated with ICT? What is a perceived affordance strongly associated with ICT? For this study, it would be an affordance easily identified with an expected affordance stemming from ICT. It could also be an unanticipated – and often unwanted – affordance (or constraint) which provokes some form of reaction on the part of academics. This is what is evident in the way academics manage the unanticipated distractive potential of ICT, for example. ICT – comprising a whole set of artefacts, services and features – doesn't simply insert itself into an environment with a passive set of affordances waiting to be perceived by the academic who moves from one scene to another (the home to the office for instance). Academics are always in the environment of which their body is part and parcel. Affordances are perceived by academics as they engage in a practice with the environment. This task could be reading an article or giving a lecture. Every aspect of how the body and environment are engaged to produce a practice – sitting in an office, on a chair, facing a screen whilst holding a mouse scrolling through a document, or standing in front of a class projecting one's voice – are perpetual occurrences of affordances. Most occurrences of affordances on a typical day are not new to academics. They are learned as part of a practice either from training or habit. When new ICT is inserted into the environment with all its attendant features and services, it is done with the expectation of new affordances. As the new technologies are engaged with in practice, their perceived affordances – that is, which is perceived to be possible for a specific purpose – arise. Expected affordances never materialize and constraints are almost always usually encountered in practice. This is evident in how interviewees describe their frustration with how technologies are distracting them or are too bulky to carry through airport security. In the process of dealing with these constraints, either

the practices within which these constraints arise are adjusted or the technologies are adjusted in terms of their properties to align the perceived affordances with expected affordances. The former is what effects change in how the academics organize their workaday in time and space. This is evident in how many interviewees describe their tendency to prefer the office because of the combination of atmosphere and better printing and bigger screens. For others, the home is more appropriate for other tasks such as intensive reading or marking exams. The distractive potential of ICT is also dealt with sometimes with simply going to work in locations where those distractive potentials are neutralized such as cafés where Wi-Fi is unavailable. This is in effect the relationship between the block 'Organizing the workaday in time and space' and 'ICT Affordances'. The distractive affordance of ICT is eliminated from the environment by removing connectivity to the Internet. This results in a circular relationship where affordances are instantiated by practice and then another practice exercises some effect on the environment to change or eliminate this affordance. This is how an expected affordance turns into a perceived affordance, which in turn may generate action on ICT at the origin of the perceived affordance.

#### 4.2.1.2.7 ICT Affordances <-> Managing ICT -> Organizing the workaday in time and space

As mentioned above, when academics encounter constraints from ICT or an expected affordance fails to materialize, they will sometimes act upon the properties of ICT to directly effect change on affordance offered by the environment the ICT is a part of. This is in opposition to changes in habit and routines. However, a closer examination of the evidence from McGill suggests this not to be the case. None of the data coded as 'Managing ICT' deals with the actual modification of the material or functional properties (such as the changing of the code of a program or technical configuration). This was expected based on Leonardi's framework (2011) which claims workers change properties of technologies to modify their affordance. This claim is not supported in the case of academics at McGill. The data collected in the Desautels Faculty of Management suggest all efforts to effect change on affordances are channeled through academics' agency on their habits and routines. Further analysis reveals the data coded in 'Managing ICT' corresponds to actions academics take to work with affordances of technology or work around its constraints by modifying the organization of their

workaday in time and space. This category emerged as part of the coding process because it was expected, as per Leonardi's framework (2011), that certain manipulation of technology by academics could constitute being modifications of their properties. The manipulations coded in this category are descriptive of how academics organize their work taking advantage of the certain features – by turning on or off a device for example – to help them achieve comfort and the level of productivity they seek. However, such manipulations cannot be characterized as 'material changes' of ICT as specified in Leonardi's framework. The manipulations are only possible within the bounds of the affordances of the technology 'as-is' in the hands of an academic. The technologies present in an academics' environment are mostly products made for mass consumption – either by consumers or corporations. None of those cited by academics would have been designed to be modified. Furthermore, academics in a business school environment don't normally have the skills or the authority to modify technologies in their environment. Most of the material and software are closed systems and universities have policies forbidding the tampering of technology on campus unless it is for research purposes. Also, modifying software used by academics, such as word-processing or statistical software packages – would be illegal. The tampering of devices would likely void warranties. This context is in some contrast with Leonardi's engineers working in an automotive safety lab (2011).

This analysis results in the category 'Managing ICT' being redundant with respect to the core category of 'Organizing the workaday in time and space'. It should appear as it's sub-category. There is no longer any justification for the arrow between 'Managing ICT' and 'ICT Affordances' to be bi-directional. The evidence from McGill doesn't support the effecting of change of ICT affordances with direct manipulations by academics. 'ICT Affordances' are responsible for practices captured in 'Managing ICT', but these practices only lead to actions changing the environment and hence the perceived affordances of ICT.

#### 4.2.1.2.8 ICT Affordances <-> Managing Paper -> Organizing the workaday in time and space

Just like the category 'Managing ICT', 'Managing Paper' becomes redundant for similar reasons. The importance of paper for academics results in the need to develop ways of

managing the production of documents with printers and the large volumes needing to be handled and stored. Paper materially and socially affords possibilities for academics not perceived as available with ICT. The affordance of working paperless, and thus avoiding the constraints of handling and storing paper, leads to a paradox once it is put into practice by academics. The evidence shows most academics simply prefer paper for reading documents and annotating them even though this is possible with ICT. Furthermore, most academics interviewed at McGill are very attached to high-volume printing facilities available in their workplace. Documents are easily printed and collated with advanced functions allowing jobs to be sent from remote locations such as the home. Some of the printed matter is kept as archives while some is discarded once the documents have been consumed (read and annotated) and no longer needed. This practice requires organization in space and time. The category 'Managing Paper' is a direct result of the affordance of ICT allowing for the easy production of printed matter and has consequences as a function of where this production occurs and how it is managed by academics.

None of the academics interviewed are engaged in changing the material properties of ICT allowing them to print documents. Just as in the case of 'Managing ICT', academics perceive the affordances of ICT as allowing them to either work paperless or with paper. Their decision to do so seems to be related to the broader context of their environment, and to an important degree the affordance paper offers in relation to their bodies. This is despite the physical constraints printed matter presents. The management of printed matter therefore is simply expressed as certain ways of organizing the workaday in time and space. This analysis results in the category 'Managing Paper' being redundant with respect to the core category of 'Organizing the workaday in time and space'. It should appear as it's subcategory. There is no longer any justification for the arrow between 'Managing Paper' and 'ICT Affordances' to be bi-directional. The evidence from McGill doesn't support the effecting of change of ICT affordances with direct manipulations by academics. 'ICT Affordances' are responsible for practices captured in 'Managing Paper', but these practices only lead to actions changing the environment and hence the perceived affordances of ICT.

#### 4.2.1.2.9 Uneven distribution of affordance -> Organizing the workaday in time and space

We already saw how the ICT Affordances -> Affordances paradox -> Organizing the workaday in time and space nexus drives habits and routines of academics. Within the 'Affordance Paradox', we see the uneven distribution of affordance as playing a role in how academics decide where and when to work. When deciding where to use certain devices for work, academics are constrained not only by the technical limitations of the technology, but also social constraints. The fluid environment of an academic on the move with a smartphone, for example, is a landscape of mountains and valleys where certain passages are easier than others. The mountains and valleys are both of technical and social composition. A 3G/cellular signal will not be available in the Montreal metro to access a link sent by a colleague or speaking with the very same colleague over the phone could be awkward on a crowded bus. A good example of this sort of social constraint is illustrated on the 5<sup>th</sup> floor of the Bronfman Building where the McGill Desautels Faculty of Management is located. In Figure 22, we see a sign posted declaring the reception area as being a 'CELL PHONE-FREE ZONE', hence making this space socially inhospitable for those wishing to take or make calls on their mobile device. Such a social constraint presents the academic (or anyone passing through) with an obstruction to the expected affordance of seamless work across space and time. This has obvious implications on how academics would perceive this reception space and adjust their habits and routines accordingly. This also shows how occupants of a space exert some control over their environment. We will see in the next section how this ties into how the distractive potential of ICT contributes to this shaping of spatial practices

#### 4.2.1.2.10 Distraction -> Organizing the workaday in time and space

As mentioned in the previous section, the image of the reception area on the 5<sup>th</sup> floor in Figure 10 shows a sign making the space a 'CELL PHONE-FREE ZONE'. The fact that this sign was produced with standard word-processing software and using a printer available in the office suggests it was put up after a certain experience of getting disturbed by the occupants of the office. This is despite the glass dividers protecting those having their offices in this part of the floor. It is quite possible that the ability to see those speaking on their mobile devices enhanced the distractive potential of ICT.

Hence, the distractive potential of ICT is in fact not just for the user, but also for others sharing work space. The relationship between ICT affordances and the body can be gleaned from other photographs of the 5<sup>th</sup> floor area.



Figure 22 - Sign posted in reception area of 5th floor of the Bronfman Building at McGill (Author)





Figure 23 – Main reception area of the 5th floor of the Bronfman Building at McGill (Author)



Figure 24 – Main reception area of the 5th floor of the Bronfman Building at McGill (Author)

The design is one of openness with glass partitions and airy space, but the glass betrays a sense of the distractive potential of such openness. The semi-frosted glass betrays this openness by protecting occupants from the distraction of the 'outside' space. The possible justification that it increases luminosity is difficult to understand given that the glass partition is within a space in which very little natural light is diffused. Also, privacy is a weak argument given that other offices are in open view and the glass can be used for writing on, just like a whiteboard. This design affords distraction, not just by people speaking on their mobile devices, but by others simply passing through. The monitors playing video in a loop and embedded in the glass display case also presents a certain distractive potential for those sitting in the reception area and in the offices around. ICT should be considered one source of distractive potential, however only when the whole environment is considered. Had there been classic opaque dividers, the monitors in the glass display case cabinet would not be a potential source of distraction for the occupiers of the offices with a transparent view in the direction of the monitors. The same could be said of the distractive potential of conversations on mobile devices in the open reception area – the installation of classic opaque dividers may have helped in attenuating the distractive potential of ICT. We see how the design of the interior of a building affects the affordance of ICT and how this in turn shapes the practices within the space concerned. Having been a regular visitor to the reception area of the 5<sup>th</sup> floor of the Bronfman Building, it was clear that this space was not seen socially as an appropriate space to hold conversations, whether in person or on a mobile device. The photos in Figures 23 and 24 attest to this. These photos also further support the observation that the common areas of the 5<sup>th</sup> floor of the Bronfman Building are not very socially active spaces. During the observation period, there was hardly anyone to be seen, even though these observations were made and photos were taken in the middle of October – a very busy time of the academic year.

The evidence from observations and interviews at the Desautels Faculty of Management of McGill University points to distraction as being a very powerful driver for spatial practices. Academics seek to tailor their environment to their need to regulate their attention. This turns up as a constant negotiation between what the environment affords in terms of distraction and concentration. A fine balance between what could be considered an unproductive practice from a productive one. This negotiation is a

complex one, since judging which activities are unproductive and which are productive is contingent upon many factors which change over time – even from one minute to the next. However, the evidence from McGill suggests academics are keen to maintain some control over their environment as is suggested by their feeling of autonomy in their profession. This sense of freedom is unanimous amongst those interviewed at McGill regardless of their stage in their academic careers (faculty and PhD students combined). The spatial dimension to this sense of freedom is quite strong, and ICT is seen as an important factor in affording this freedom. However, this affordance underpinned by ICT also affords distraction and pushes academics to develop spatial practices to manage this affordance.

#### 4.2.1.2.11 Ergonomics -> Organizing the workaday in time and space

As seen in the section examining the 'ICT Affordances' -> 'Affordances paradox' -> 'Organizing the workaday in time and space nexus', the physical characteristics of the environment and how the body is articulated with these characteristics is a determinant factor in how academics organize their workaday. We have seen how ICT specifically contributes to the environment by affording comfort for academics in their daily use of technology. The size of screens and the use of physical keyboards are two examples of how ergonomics plays a role for academics at McGill. These affordances are unevenly distributed, meaning academics will perceive affordances related to comfort of use of ICT differently at the office, at home or on the move in public transport. Ergonomics is therefore a contributing factor in how academics go about organizing their workaday in space and time. Depending on other factors as well, such as mood, tasks needing to be accomplished, academics will choose accordingly where they will work from on a specific day. They can also otherwise adjust their planning of tasks over the course of a day depending on where they find themselves at specific times. Other ergonomic factors such as the bulkiness of a laptop can also determine when and where certain devices are used. These combine with other ergonomic factors to produce a landscape of affordance which shapes how academics organize their workaday in time and space.

#### 4.2.1.2.12 Organizing the workaday in time and space -> ICT Affordances

In navigating the landscape of affordances, academics develop routines and habits allowing them to manage these affordances with the objective of achieving certain work-oriented goals through the course of a day. By freely navigating through their environment, academics exert some degree of control on those affordances they perceive. This can be done by choosing where they work and when. ICT being an integral part of an academic's environment, any control of these affordances involves the manipulation of devices and their associated services. This can be achieved by simply turning off a device or disabling certain features or working from a place where the device in question will have limited functionality. Hence, the academic can exert some control on affordance either by simply moving to a location where affordances are different or change the affordances with manipulation of technology (or of any other characteristic of the environment). In any case, the perceived affordance associated with a device is dependent upon the rest of the environment, so changing location will almost always impact upon the perceived affordance of a device. With specific regard to ICT and affordances, there are two dimensions emerging from this relationship between ICT and organization of the workaday in time and space. First, ICT through its contribution to affordance is a determinant factor in how academics organize their workaday. Second, this organization, mainly based on well-bedded institutionalized practices, compels academics to exert some control over the affordance in their environment. This control can be on ICT or any other aspect of the academic's environment. The well-bedded institutionalized practices of academics have been developed over centuries. However, as with other major past disruptive innovations, such as the printing press or the telegraph, ICT disrupts these practices in fundamental ways by changing the landscape of affordances for academics. These disruptions occur because of two forces – one is the expectation of affordance at the time ICT inserts itself into the environment (for example a new device is acquired or existing software is updated with new features) and the other is the actual perceived affordance once engaged with ICT in practice. Expectation leads academics to try changes in their daily routines, perhaps by trying to write emails on their smartphone whilst taking the bus or working from home. Most of the time, however, perceived affordances once engaged in practice are not aligned with those expected. In some cases, the reaction is complete removal of the concerned ICT from the environment. But most of the time, perceived affordances lead to adjustments

in routines to make the most of what ICT offers. The findings from McGill show how academics seek to control their environment and its associated affordances by effecting changes to it by modifying their physical setting (by keeping their office door open for example) or instituting social norms (putting up signs in part of an office area making it a noise-free zone for example). These changes can be applied to ICT specifically by turning off notifications on a device or making a reception area a mobile-free zone for example, hence modifying the perceived affordances of ICT.

Although it is usually assumed academics go about their daily practices with very specific goals and orientations – as suggested by the attention-based view of the firm (Ocasio, 1997) – the evidence from the data collected from McGill suggests more is at play. The academics interviewed seek environments affording a certain mode of attention which is not always narrowly focused on a goal. Many see the office environment as affording both concentration and distraction at the same time. The key it seems is the ability to modulate these affordances to fit the mood at the time as well as adjust to unexpected changes in the environment. Achieving a balance between various modes of attention over time is a challenge expressed by all of those interviewed. The most stable forms of practices helping establish this balance is through well-worn routines and habits. Each academic has mapped their daily space not only in terms of what each location can afford in terms of modes of attention and at what times of the day, but also how much control they may have on affordances. These practices are grafted on existing traditional practices of academics in business schools. The office remains the center of the constellation of workspaces which academics identify as appropriate for engaging in work. However, the home seems to have acquired a more important role and third-spaces (a café for example) along with transitory spaces (an airport lounge) as well in providing environments affording work. ICT is seen as the main enabler for this trend, and is appreciated as such. The expansion of the time-space continuum of work makes the management of modes of attention more of an active concern, especially since the environment and what it affords varies enormously between the home, the office and the bench of a park in downtown Montreal for example. In terms of ICT, the environment varies because each space is associated with different devices (or an absence of) and different features and services. Adding complexity to this concern is the fact that ICT is constantly evolving in terms of features,

accessibility and social acceptability. Many of those interviewed at McGill seem to be engaged in a perpetual quest for the ideal environment for the desired mode of attention at the appropriate moment. Moods and desires change over the course of a day, week or longer. This means the ideal environment is never quite experienced, but all efforts are made to tend towards it. These efforts consist in not only ensuring stable and predictable environments such as the office or home, but also actions in dynamically adjusting the environment to suit specific goals and desires.

It is striking to notice the primary role of the body in driving the spatial practices of academics at McGill. Attention – or the lack of – is the key measure against which academics evaluate the affordance of an environment in the context of professional activities. This includes how ICT contribute to this affordance, and distraction is their main contribution, according to the data collected at McGill. Although distraction is welcome at times, academics feel ICT regularly leads to undesired interruptions in their flow of attention. These distractions, often described as experiences where one finds themselves working on a document one second, and then the next watching YouTube videos of cats or consulting their Facebook posts, are very common. In these instances, academics feel they have lost control of their mode of attention. It leads to frustration and a response in the form of actions to eliminate the source of distraction or attenuate it. This response involves the body as well. Some academics question having their mobile devices on their body or close to them at all times. This is due to the perceived temptation of checking their device for messages or notifications or simply surfing the Web. Many academics exploit the bodily affordance of moving to a location where the potential distraction from ICT is either discouraged by the gaze of peers (appearing as professional or not ‘goofing off’) and also by their behavior (everyone else is deep into their work and the feeling of competition), or simply making it impossible for ICT to distract them (going to a café where there is no Wi-Fi or going to a park with no devices on them). Moving location has obvious spatial implications, however so do other actions involving the body. Some interviewees at McGill would place their mobile devices away from their bodies and out of sight so as to not be tempted by their distractive affordance. In these instances, the body is motivated to change the environment and its ICT-based affordances to better control modes of attention as desired. The motivation to change the environment is evidently rooted in a cumulated frustration and awareness of how

ICT can pull academics' attention away from that which they feel is more important at a given instant. Some even refer to their tendency to indulge in distraction as an addiction.

Consequently, there appears to be a cycle where the body physically instantiates an affordance in the environment, which is in turn perceived by the body engaged in a spatial practice. The body then reacts to this with either maintaining the affordance or changing it through action. This action would effect change on the environment through various mechanisms – again using the body. Some changes effected on the environment by the body do not imply changes in spatial disposition (for example, placing a device out-of-sight), but rather changing the environment by switching off a device or deactivating certain features (do-not-disturb mode for notifications for example).

The example of smartphones, as the academics at McGill use it, illustrates well this cycle. Interviewees describe how they use smartphones to check their emails on the move, especially when commuting to and from work on public transportation. Some speak of this habit as having developed after realizing reading and responding to emails while on a bus or metro ride was easily done. Most had a smartphone long before developing this habit. Developing this habit was, at least in one case, a response to the feeling of wasting time on the commute. The affordance making this practice possible is the fact that the smartphone is readily at hand, is small and light enough to manipulate in small spaces such as buses or trains, has connectivity to the Internet, and is equipped with a large enough screen and keypad to type at least some short text messages. The body is responsible for instantiating much of this affordance and it is easily perceived by it when either it sees others using it in this way, or is experimented with at some point while commuting. The specific practice of using smartphones on public transit for reading and occasionally responding to emails, is seen as desirable. Therefore, academics not only ensure they keep their smartphones at hand during commutes, but integrate it as part of their workaday routine. When they arrive at the office, they expect to have already started their workday during the commute. The cycle repeats itself and the affordance is both maintained by the practice and making the practice possible at the same time. However, occasionally this affordance is seen as undesirable, such as the cases where checking email compulsively generates distraction and frustration. The smartphone being at hand almost at all times makes it very tempting to check emails on a frequent

basis, even when it is not seen as critical. To remove this disruptive affordance and put a halt to the practice of compulsively checking emails, some academics choose to alter their physical environment by either removing the smartphone entirely by keeping it far away from their bodies and out of sight (leaving the device in the office during a class or placing it in the bottom of a bag for example), or turning the device off. The cycle is therefore broken and this affordance is no longer perceived to support the practice of compulsive email use. As was observed at McGill, this approach can be modulated in time during the course of a workday, week or year according to mood and other imperatives. In this example of the use of the smartphone by McGill academics, the physical environment and the influence over it is key to managing practices throughout the workday. The manipulation of the device itself is one way of managing practices, but so is the space, such as the one on a commuter bus. The affordance of this space – including the mobile device – is recognized as stable by the academic and conducive to a certain productivity for a certain task. Time spent in the commute is no longer considered a ‘waste’ of time. The practice is therefore desirable and hence maintained, which in turn maintains the physical environment for certain periods of the day – taking the bus to work and making sure the mobile device is at hand. The affordance is thus sustained as a stable given by the academic. In other spaces and times, such as at home when family is present, the same affordance perceived in the bus is not as desirable. In this case, the physical space can be modified by either removing the mobile device or turning it off for example. In some cases, what is considered ‘home’ is completely displaced to another location where the affordance available on the bus is technically impossible. This is the case with the McGill academic who purchased a log cabin in the wilderness where mobile signals and Internet connectivity would not be possible. It is also to a certain extent the case of those interviewees at McGill who temporarily move to a location in the city where Wi-Fi is unavailable such as a park or café. The body is mobilized both as a means and an end to break the cycle sustaining the practice of checking emails compulsively, for example. Once the physical environment modified, by the body, the affordance is no longer instantiated, by the body, or perceived, by the body, and therefore the practice rendered unrealizable. The body therefore plays a central role and is the intervening variable in the instantiation of an affordance, the perception of an affordance, and finally, the modification or continuance of the physical environment. The resulting cycle is schematically represented as a model in Figure 25.



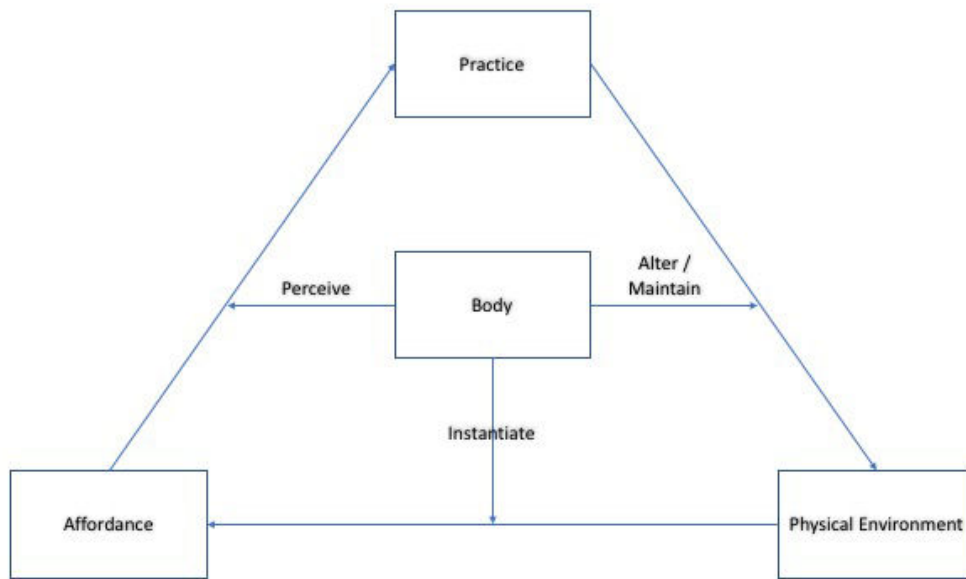


Figure 257 – Triadic causal model linking Physical Environment, Affordance, Practice and Body (Author)

In light of this conceptualization of the relationship between the body, physical environment, affordance, and practice, the structure of the categories having emerged from the coding of the data from McGill requires some adjustment before proceeding with the coding of the data from the case of the Judge Business School (JBS). This adjustment is now detailed in the following paragraph.

Before moving on to the JBS case, the coding structure resulting from the McGill case should be rationalized so that coding the JBS case can further benefit from the results of the analysis of the McGill case. Following this rationalization, the remaining categories will be available for the coding of the JBS case. All of the existing categories, with the exception of ‘ICT Constraints’, ‘Managing Paper’ and ‘Managing ICT’, will remain as they are. The analysis shows the category of ‘ICT Constraints’ as being redundant with ‘Affordance Paradox’. ‘ICT Constraints’, as they are expressed by academics, are usually implicit in their description of frustrations and difficulties of using technology day-to-

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<sup>7</sup> Methodological note: In this new model, ICT doesn’t show up explicitly as an independent concept (like in the previous one), but it is captured by the data collection (focus is ICT). The physical environment is to be taken as a whole to be coherent with Gibsonian affordance and findings.

day. These frustrations and difficulties are systematically coded in 'Affordance Paradox'. The category 'ICT Constraints' is therefore no longer valid and will be archived. Both 'Managing ICT' and 'Managing Paper' are included within 'Organizing the workaday in time and space'. These two categories will therefore be merged with 'Organizing the workaday in time and space'. Their relationships with 'ICT Affordances' will be maintained by moving them to the category of 'Organizing the workaday in time and space' and modified schematically to reflect its cyclical nature. The top-level category of 'Habits & Routines' is no longer required as it is redundant with 'Organizing the workaday in time and space'. The latter now becomes the top-level category while the former is archived. The resulting new coding structure is shown in Figure 26 and the codes have been consequentially revised in NVivo. It is important to note that this coding structure represents the rationalization of the McGill coding categories by taking into consideration the most obvious redundancies having emerged from the coding of the McGill case. The JBS case will benefit from an initial coding structure based on the results of the analysis of the McGill case and generating the model in Figure 25. The remaining rationalized categories from the McGill case will always be available to capture data of interest should the new coding structure not be conceptually appropriate.

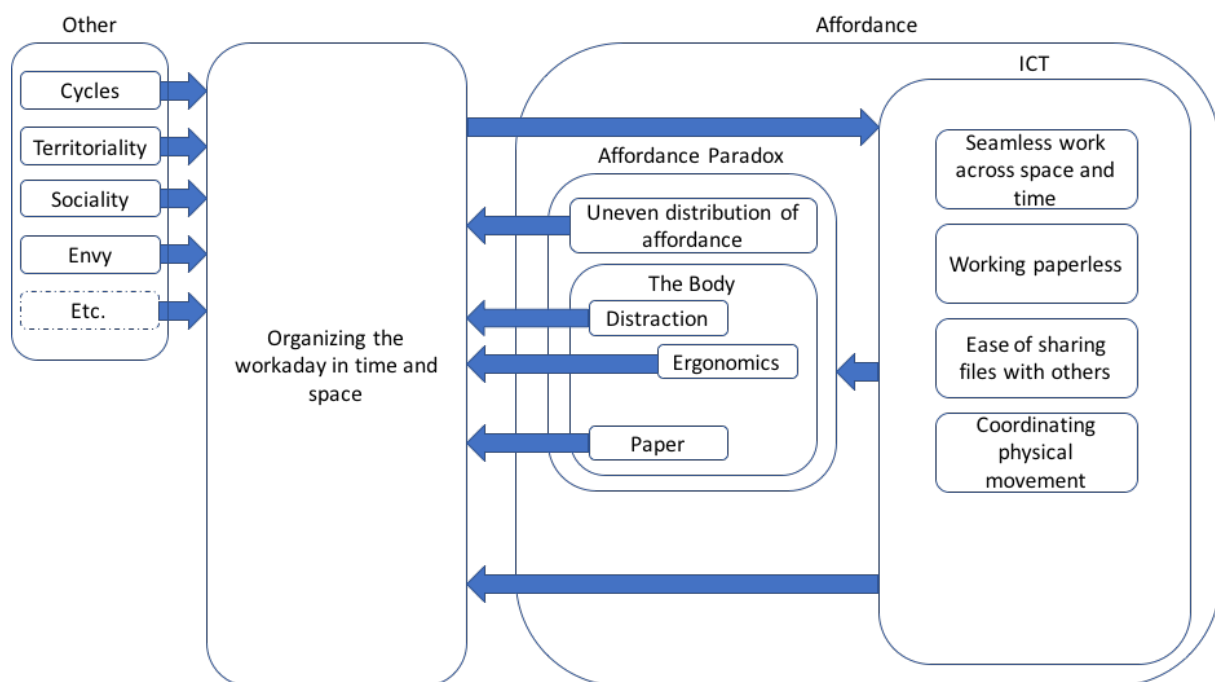


Figure 26 – New coding structure for the Intensive Phase at JBS after analysis of McGill (Author)

#### 4.2.2 Case 2: Cambridge University – Judge Business School

According to Yin (2008), a replication logic in a multiple-case study implies that each subsequent case must benefit from the theoretical conclusions of the previous case analysis. This makes sense since disregarding such conclusions would impoverish the research and deny learning from insightful conclusions along the way. However, according to Yin's replication approach, the lessons learned from previous cases should be applied to the research design of the subsequent cases. In the instance of this specific multiple-case study, this isn't possible since data collection for the JBS case was undertaken prior to a full analysis of the results from the McGill case. Only the coding and analysis of the data collected from the JBS case can benefit from the lessons learned from McGill, not the fieldwork.

The model shown in Figure 25, resulting from the initial analysis of the data from McGill, provides the basis for coding data from the case of the Judge Business School (JBS). A coding structure can be developed using the four high-level conceptual categories of Practice, Affordance, Physical Environment and Body. However, focusing on these four categories would leave out the crucial relationships between them. It is therefore sensible to add to the initial coding structure three additional categories representing the causal relationships between each conceptual entity. These three relationships are Instantiate (by Body and Physical Environment), Perceive (of Affordance by Body), and Alter/Maintain (by Body upon Physical Environment). These three categories are added to the four conceptual entities making up the model in Figure 25: Body, Practice, Physical Environment, and Affordance. Hence, a total of seven new coding categories emerge from the analysis of the McGill case for the benefit of structuring the data from the JBS case.

From a practical standpoint, the seven new categories will be added to the existing rationalized ones from the McGill case in NVivo. These will be labeled as categories applied to the JBS case only in NVivo to avoid any confusion with previous categories with similar names. As mentioned earlier, the remaining categories from the McGill case will be available to capture any data of conceptual value not accommodated by the seven new categories generated by the model in Figure 25. Each reference is identified as belonging to either the McGill case or JBS case and can therefore be distinguished from

each other in the analysis. The seven new categories for the initial coding of the JBS case can eventually be merged with the remaining categories from the McGill case should this make sense.

#### **4.2.2.1 Coding**

Coding for the JBS case revealed that only three of the new categories emerging from the analysis of the McGill case were useful to make sense of the JBS data. Instantiate (by Body and Physical Environment), Perceive (of Affordance by Body), and Alter/Maintain (by Body upon Physical Environment) captured the data supporting the dynamic cycle of bodily engagement with the physical environment in the context of the day-to-day practices of academics at the Judge Business School in Cambridge. Coding for Body, Practice, Physical Environment and/or Affordance seemed to bear little fruit given that each of these categories were uninteresting on their own and would not uncover much regarding the relationship between them. It is understanding these relationships that will help in formulating a response to the research question put forth and, more broadly, provide insights on the relationship between ICT and organizational space. Therefore, the codes Body, Practice, Physical Environment and Affordance were set aside during the coding in favor of the categories representing the relationships between them.

In processing the data, each time an affordance was perceived by the body in the context of a practice, it would be coded under Perceive. Similarly, each time a change in practice would be affected on the physical environment with the body, the data would be coded under Alter/Maintain. Any evidence of the instantiation of an affordance by the body in a given physical environment would be coded under Instantiation. It became quite clear as the data was processed, that the codes Instantiate, Perceive and Alter/Maintain were concurrent most of the time. All of the data was also coded under the existing categories developed with the case of McGill whenever this would be appropriate. The coding of the data from JBS also generated 5 new categories: Business school context, Food, Faculty struggle for office space, Sensuality, and Changing landscape of BS (Business Schools). These categories were created after careful consideration of existing categories and their appropriateness for the data being handled. The fact that some of the data from the JBS case was not appropriately captured by the existing categories from the McGill case indicates that it could be useful in the cross-case analysis. Some of

these categories emerged from the JBS case due to the specificities of this case. These will be explored further in the analysis of the JBS case. The structure resulting from the coding of all the collected data for the JBS case is found in Figure 27. This chart was generated using features available in the NVivo software. The size of each of the blocks reflects the number of references contained in each of the corresponding categories. The key categories produced the most references: Perceive with 151, Instantiate with 141, and Alter or Maintain with 143. Within this set, 136 references were concurrently coded under these three key categories, suggesting a solid conceptual link between them. This will also be explored further in the analysis of the JBS case.

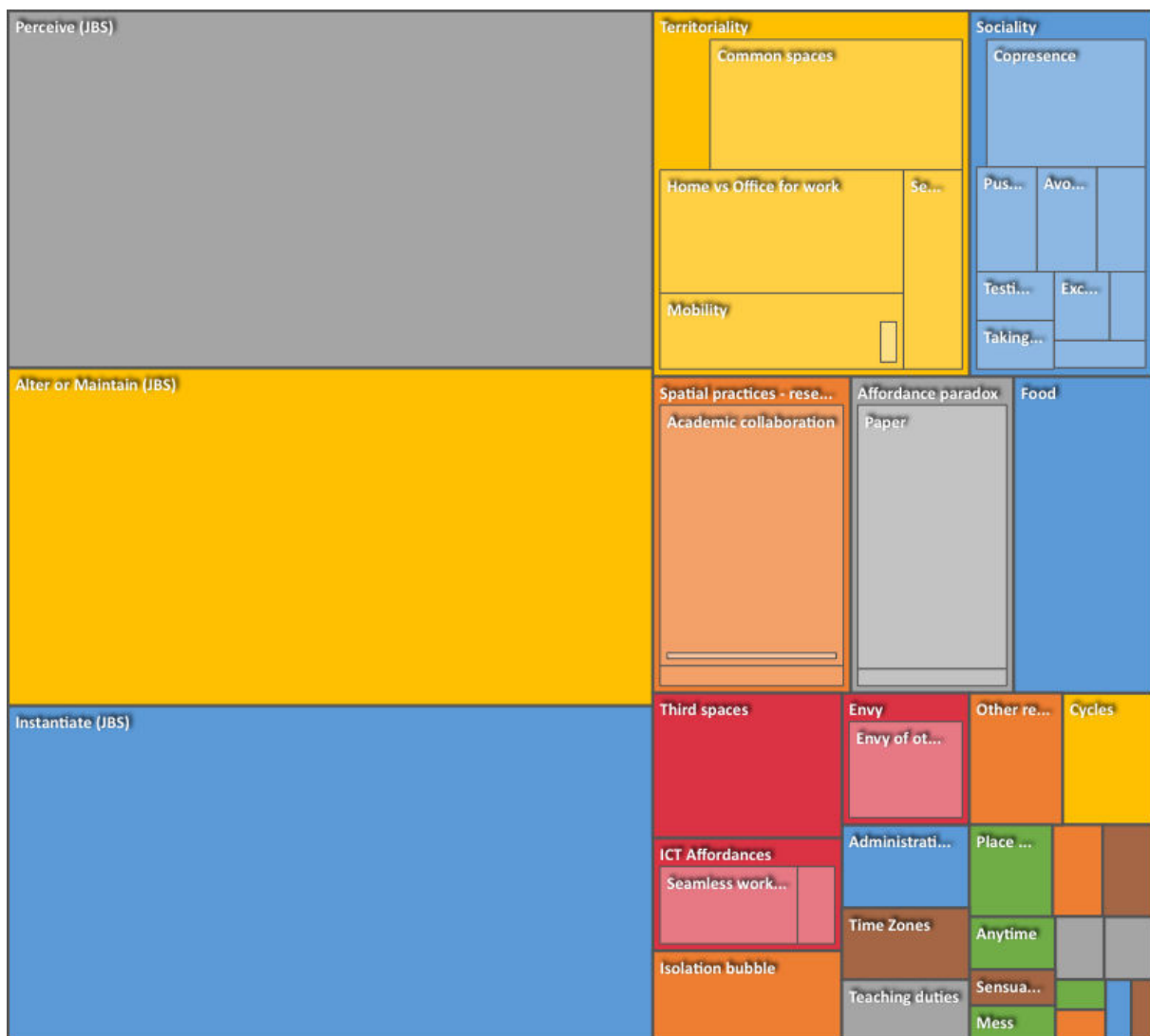


Figure 27 – Coding chart for Intensive Phase at JBS (Author)

The resulting coding structure in Figure 27 also reveals many references coded under various other categories inherited from the McGill case. These are on top of the new

categories generated by the JBS case. Given that these categories are shared with the McGill case, they will be considered as part of the cross-case analysis.

As mentioned, 136 instances of concurrent coding points to strong conceptual links between the three key codes, these conceptual links are the Body, Affordance, Physical Space and Practice. However, this link is not static, but dynamic and showing a causal cycle. Instead of presenting the findings for each category, as was done in the case for McGill, the results of the JBS case can benefit from the structured framework of the conceptual model upon which the coding was done. This means that the results for the key categories of Instantiate, Perceive, and Alter or Maintain can be considered as part of a triadic causal cycle. This cycle, however, can only be considered by looking at specific activities, movements or actions animating it. All 136 references coded under the triadic causal cycle concurrently under Instantiate, Perceive, and Alter or Maintain are either explicitly – through coding – or otherwise implicitly strongly associated to a specific practice undertaken by academics. The results for coding and the analysis will therefore be structured according to the associated academic practice for which a given instance of triadic causal cycle is being considered.

Using the tools available in NVivo, all 136 instances in the data of concurrent coding under the three key categories of Instantiate, Perceive, and Alter or Maintain were reviewed carefully. This exercise revealed some important characteristics of the findings for the JBS case. Firstly, the triadic causal cycle was not as strongly evident in all 136 instances of concurrent coding as initially believed. For many instances, there was weak evidence of the causal chain in the proposed model. This is likely due to the application of much looser inclusion criteria during coding to diminish the risk of missing instances. Closer examination has resulted in 49 instances of concurrent coding being set aside. However, these instances could prove valuable in the analysis when considering the detail in the causal chain of the triadic cycle. Furthermore, of the 87 remaining instances, 26 did not have ICT explicitly cited and hence could not be considered for the purposes of the study of the relationship between ICT and organizational space. These as well have been set aside for further analysis should they prove to be of relevance. The 61 remaining instances can be considered for the analysis of the JBS case. They relate to various practices undertaken by academics on a day-to-day basis. These practices can be

broken down into two broad categories: Individual work and collaborative work. Individual work, or work not requiring direct interaction with others, represents the lion's share of an academic's professional time commitment. This is due to the nature of the types of activities engaged in by academics: processing emails, reading, analyzing, conceptualizing, writing and preparing teaching material. Collaborative work, necessary and increasingly encouraged in the current business school environment, is present in the form of wide-ranging activities from socializing to more formal meetings regarding research projects, teaching duties or administrative issues. The findings from the JBS case can therefore be structured according to these activities, also considered as practices. This breakdown and the number of corresponding instances can be found in Table 3. The findings from the JBS case will be presented according to this structure. Not all instances from each category will be presented, only those providing significant and original contributing elements.

Type	Activity/Practice	ICT	Non-ICT
<b>Individual</b>	<b>Reading analyzing and conceptualizing</b>	24	24
	<b>Unspecified</b>	21	
	<b>Writing</b>	2	
	<b>Taking breaks</b>	2	
	<b>Teaching duties</b>	1	
<b>Collaborative</b>	<b>Collaborative writing</b>	12	2

Table 3 - Breakdown of instances of code by activity (Author)

#### 4.2.2.1.1 ICT

##### 4.2.2.1.1.1 Individual Work

##### 4.2.2.1.1.1.1 Reading, analyzing and conceptualizing

Academics normally engage in reading, analyzing and conceptualizing for many hours during a week. These hours are ideally blocks of time reserved for uninterrupted concentration. However, with current demands, especially in business schools, these blocks of time are increasingly difficult to find and new and more frequent distractions

deteriorate conditions for concentration. This trend is not solely due to the disruptive nature of ICT, but also the broader context of higher education, changes in urban environments, the evolving social fabric, and shifts in the nature of work, amongst other factors. In these conditions, academics seek to optimize their resources in time and materials to produce the best work. The ICT tools used today for assimilating and producing knowledge are increasingly ubiquitous and therefore academics can practice their craft in many locales, not just the office. However, as we will see here regarding the specific activity of assimilating knowledge with reading, analyzing and conceptualizing, practices are dependent on how academics perceive their environment and what this environment affords them for specific tasks and modes of attention.

Just like the McGill case, the findings of the JBS case continue to be striking in the importance academics attribute to working with paper. In the context of this research, it is interesting for two reasons. First, ICT increasingly allows the rapid production of large volumes of printed matter. This is evidenced by the interviewees who appreciate this feature. Second, the possibilities offered by ICT to avoid the inconvenience of the printing and carrying of documents – simply the ability to read on-screen – would lead one to expect perhaps more of a preference for working digitally. With 24 references, this category has produced the most instances of the triadic cycle. The academics at JBS had varying degrees of affinity for working with paper, and all combined paper with on-screen work. Each of these instances provides evidence – according to the coding – of the causal chain between the body, the physical environment, affordances and practices. The presentation of these instances will be ordered by progressive use of on-screen resources starting with the academic with the most affinity for paper. Interviewee #34 says “I’m a print person”. She goes on to say:

I much prefer to have text and to work through text. And, in fact, the first job I’m doing today is I corrected the text last night on... In pen, and I’m correcting it online now, because then I can feed it into NVivo. But, no, I’m a print person. And, yes, there’s still a few of us about.

It seems that only a constraint such as using a qualitative data analysis software package pushes interviewee #34 to work on-screen. In fact, she started off working on paper and then transposed her work on paper to the screen. This suggests that working directly and exclusively on-screen hasn’t provided the desired or expected experience for this academic, and has instead been a disappointment. The facility to print at high speed and



large volumes, provided by JBS, ensured the practice of working from hard-copies of documents endures.

Q: Okay. So where do you do your printing?

A: I try to do it here, because we've got a much better-quality printer. I have a printer at home, and I will use that if I need to, but I much prefer to print here.

Q: Okay. And...

A: Are you going to get a record from our IT department of the print rounds of members of staff?

Q: Maybe. Possibly, yes.

A: Because I, you know, I think when... There are times when, particularly on a Friday, when I've sent all my things to print and I'm taking them home, and I'm very conscious that if anybody did look at the printments, they'd find peaks for me on a Friday. But, yes, I'm a print person.

Q: And you carry those sort around, or what happens to that? I mean, I noticed there's some papers on the shelves there, but...

A: Right, there are lots. Yes.

Q: Yes, it's...

A: What... I had to clear out...

Q: I've seen more.

A: Yes, I had to clear out two weeks ago. And there's a cupboard behind you.

Q: Okay. All right. Okay, I didn't notice that.

A: Well, that's why I always try to have my car on a Friday.

Q: Okay.

A: Because I take it home, and then I work through it at home, and that works for me.

Q: Do you have the equivalent kind of space at home? Like, I mean, with papers and...

A: It's... Yes. Yes, I have my own space with my own shelving and my own stuff.

The production of such large volumes of printed matter by interviewee #34 requires adequate space to handle and archive documents both at the home and the office (see photo of office of interviewee #34 in Figure 28). In this instance, the academic also organized the logistics of producing a batch for the weekend on Fridays and the transfer of some of these documents from the office to the home by going to the office by car on Fridays.



Figure 28 – Office of Interviewee #34 (Author)

Interviewee #37 is much more reflective regarding his preference for paper:

Q: Do you prefer to work on paper than rather...?

A: I read on paper. So if I got a paper or a book that I'm wanting to read, then I prefer to have physical copy. And that's for two reasons, I think. One is that the physical copy is... Has a sort of... Is sort of defined quantity, so you know there's a book, and how far you are through. The PDF, and the non-PDF, you... Or that you can sort of track it, then you don't have this... That same sense. And also, because particularly if I'm reading stuff where I wanted to sort of... For reviews, I want to be able to annotate, so I will write over things. And while they can do that in... On PDFs, the sort of overhead of doing so is much greater than with paper, for me at least.

For this academic, the physical copy of a book or document offers more possibilities of bodily engagement and knowing about it – for example, where in the document one is at. The perception is that this is unavailable on-screen. Requirements for space in order to handle and archive these documents is illustrated by the following extract of the interview and Figures 29, 30 and 31.

Q: Do you scan a copy? Or do you just keep the hard copy as an archived? Do you...

A: Well, so this stuff here is usually papers that I'm involved in with journals, which are in a sort of interim stage, so I'm waiting for another version of that paper to come through. Or it's something where there is a... There is some reason why I might need to keep that. Or where I've sent a paper away for... Given a R&R

on a paper, and you're expecting another version to come in, so I keep the old version just to save us a pretty... Another copy of it, then I look in my reviews for that. But I also have the actual reviews or editorial reports on my... In my computer, so I will check those as well.



Figure 29 - Office of Interviewee #37 (Author)



Figure 30 - Office of Interviewee #37 (Author)



Figure 31 - Office of Interviewee #37 (Author)

Interviewee #47 feels the train to London doesn't really afford working on the laptop and is better suited for reading hard-copy documents:

Q: Okay. And when you're on the move, lets say if you're... You are on the train to go to London, do you do any work on the move? Do you have... Yes.

A: Yes. So I would bring a hard copy with me. Or if I... Yes usually it's hard copy. So I don't really work on my laptop on a train. [Inaudible] I would print something out, that I have something that I can read.

Q: Okay. So you prepare your material before you leave?

A: Yes.

The preparation of printed-matter certainly has spatial consequences for interviewee #47 - where does she print? Does she go to the office before taking the train to print? Unfortunately, these follow-up questions were not asked due to time restrictions for the interview. Interviewee #36 has the perception of paper as better for reading, annotating and editing, but sees the screen as better for creative work. Interestingly, this academic scans handwritten notes to keep handy in the Cloud. He prefers taking notes by hand and then takes advantage of the possibilities of ICT for storage and quick availability (Evernote). The storage in the Cloud of notes seems reassuring for this academic:

For example I'll take notes in a conference, I'll come back and run it through the scanner and then I don't worry about losing my physical notes because I know I've got a copy of it on the PC. In fact I would've done that for the last couple of years since that option was available on the printer because it's easy. About six months ago they hooked up with Evernote and so now I've also uploaded that into the Cloud.

Furthermore, interviewee #36 also prefers working on hard-copies for important documents:

Q: Okay you mentioned printing, especially like in the café when you have these specific tasks, how much printing do you do?

A: So anything that requires certainly editing, so if I've got a complete draft of a paper then I'll print it off and go through it on the hard copy. Same with the reviews, I don't like reading off of the computer simply for the purpose of reading, I want to read off of the physical printout. If I'm creating work, I don't particularly have a notepad or anything like that, I'll create it on the computer.

Interviewee #35 prefers hard-copies for deeper consideration of articles and for versions of written work for annotation:

Q: Do you print a lot? Do you do a lot of printing?

A: So, I think it's a very relative question. I don't know. I try not to print too much, but I do print. So when I work on my papers, I print the different versions because I'm going to take some hand notes on them. When I read papers, what I

do is I scan them on the computer, but if I really like them and if I want to go deeper, then I would print.

Like most others interviewed, interviewee #45 prefers to work on hard-copies of important papers. Interestingly, she also prefers to read paper documents on her bed:

A: It depends on the paper. If I think the paper I will use as a model is very important for me I will print out and do some, um marks [annotations] yeah, yeah, but if I think this paper, I just review, I will just read this. On the screen.

Q: Um, the, when you print out the paper, you would read it at your desk, here, in the PHD room?

A: Yes [OK] yeah. [Alright] But commonly I have, uh I did bring a hard copy to my, to my apartment. [OK] This is, if I bring it, I always just lay on my bed. I just cannot work.[OK, alright.]

Interviewee #38 also prefers printing out documents requiring more attention. He also prefers to print at the office because of the high-capacity printing facilities available there. He contrasts these facilities with those available at home and expresses a sense of frustration. Instead of using the Cloud, though, this academic will load a USB key at home with files to be printed at the office and take advantage of his next presence at the office to print these documents:

Q: Do you find that when you read you prefer reading off a device or do you print out?

A: It depends on the kind of reading. So for the quicker stuff and often for referring I will actually do it all on the screen now. But if it's something I really have to work on and, you know, it's a tough thing, then I will print it out.

Q: And where do you print usually?

A: As you've just seen, the bigger things I tend to print here. So I tend to bring that with me and have them on a memory stick and then, you know, print out. I collect a few documents and print them out when I'm here.

Q: Do you have a printer at home?

A: Oh, yes.

Q: Okay.

A: But it's much slower and... yes, it's basically slow and it's also... it's an inkjet and the ink is always empty because it's one of those razorblade model things with the tiny little ink container which is always empty.

Expressing a similar degree of frustration with printing facilities at home, interviewee #26 expresses appreciation for the quality of the printing facilities available at the office. He also cites strain on the eyes from reading on-screen as the reason for preferring to work with hard-copies, especially those requiring close attention:

So, for example, I, as I say, I am still a little bit, like, stuck with hard copies, so...

Because I feel that I strain my eyes more when looking at the screen, for example, so I like to, often, I like to print out the important documents, if they really need my close attention. Now, printing so much, of course, I do have printer at home. But if I print so much, I rather do that with the really efficient printing system here. In which case, if I'm working at home, I will have to strain my eyes looking at the screen all the time, or I would have to tolerate with a very slow printer, relatively speaking.

Interviewee #30 appreciates keeping important documents, or those needing annotation, at hand by printing them out. However, these are rare cases and he mostly reads on screen because of the comfort of reading on a tablet and the freedom this gives him to read in the garden or elsewhere. When reading on-screen, he doesn't annotate, however he takes notes on-screen in a different application to the reader and uses Google Keep to synchronize across devices:

Q: Speaking of hard copy, do you work a lot with...If you want to read an article, do you do it onscreen, or do you...?

A: I try and read it onscreen. It depends a bit on the nature of the document. If I want to annotate it, I will print it out. Or if it's something I'm very sure I'll want to keep referring back to, then I might print it out. But the great majority of stuff I'll read onscreen. Now, having said that, if I read onscreen, I might well read on a tablet or on my phone, so I'll download it and read it on one of those two devices, you know. Partly because I can then go anywhere. I can go and sit in the garden or somewhere. And that's sort of more comfortable than looking up. It's more comfortable to read looking down at a tablet than it is to look ahead at the screen, I find. But yes, I don't print very much out.

Q: And when you're on your tablet, how do you...Do you scribble on paper your notes, or do you actually annotate directly on?

A: I don't usually annotate. I do take electronic notes on the tablet through...Well, I'm using Google Keep a lot now. I've used various things, but that's the current one that I use, because it's actually fairly simple and it syncs across everything. But yes, I rarely want to annotate documents. It's just occasionally, sometimes I know I'm going to want to scribble all over everything. In which case I'll print it out, but that's fairly rare.

Interviewee #44 prefers the feel of paper and paper also helps him know "where things are":

Maybe I'm more of a tactile, sort of like (kinterstetic) style of learner versus whatever other modalities are used. But there's something about underlining and highlighting and, kind of, getting a feel for the paper and where things are that means I like to print papers out before I, you know, delve into them.

However, like most other academics, printing depends on the importance of the document “for less serious papers I might just scroll through the PDFs on my laptop but I’d never read or use my phone to read”.

Interviewee #43 also prefers to handle paper for reading, annotating and highlighting:

I’m very much, um, so, yeah, as far as papers are concerned, um, I do really like the fact of having, um, a hard copy, um, of them in my hands, and then being able to highlight some parts of it and not only electronically, so, physically highlight parts of it, take notes.

However, this academic in training (PhD student) also reads documents not requiring high levels of concentration on-screen or just for a skim-through. Interestingly, he cites the facility of being able to transpose data into his database when reading documents on-screen. He suggests this facility as being an additional reason to read specific documents on-screen:

I was reading on the screen because this is, and, this is basic... so these, the the, um, the, the documents that were open at that time were, were basically reports from the World Bank, and um another organisation which are really is basic info and there is no, it is very easy to read. So there is no need for a high level of concentration to pick the relevant information out of it. Um, so that I can easily read on the screen and, and just skim through and um, and, and get the relevant, um, and get whatever is relevant to me, uh, without printing them. Ah, and it’s also because, uh, while reading I just then put the information in my data set, on my database, and so there um, I need a computer anyway. Um, um, but once you get into, I think it’s very much a question of how, um, complex, the information I am going to, uh, to go through, is. So, so it’s very much a question of how complex that information is. The more complex it is, um, the more I want a hard copy, of ah, of what I’m reading. [Ok] That’s, I think, I think that’s um, [ok] that’s how it works for me.

This interviewee also expresses the desire to have documents at hand and as visible as possible from his seat in the office:

Um, no, I probably, if... if I had the opportunity to choose, I would rather have my files, all my files in front of me, uh, you know on my desk, and then on some walls maybe to the left or to the right, whatever, just have my files on the shelf, uh, there. ‘Cause when it’s at the back, well you don’t, don’t see them, uh, as easily as, uh, yeah of course you don’t see them. It’s not that it’s not easy, it’s just you don’t see.

There then appears a group of interviewees (#40, #41, #42, and #46) appreciating the freedom blank sheets of paper offer when sketching ideas or mapping concepts.



Interviewee #40 would first formulate mathematical models on paper before entering them into software:

Ah, when I'm doing some kind of maths modeling, because this is, this is a bit what I'm doing too with my background, I prefer first to do like on a piece of paper so I'm not using any, I'm not going into the computer to, in (LaTeX) or this kind of things to write model, I first go to my piece of paper and then I, I, I put it in it.

Like others, interviewee #40 prefers to annotate and highlight documents on hard-copies:

Uh, when I'm working on the, on an article on the computer, sometimes the computer, I mean the text, I, I, I hate using, um, highlights of the computer to make comments. I mean, I think it's very useful, in terms of technology-wise but I really like to have something, uh, printed [Ok] and make notes on something.

Interviewee #41 has a “set up” such that she always carries around a notebook containing a “wild mix of things” in the form of A4 papers with ideas, structures, diagrams and charts drawn upon them. She keeps this notebook at hand so that in the moment, she is able to capture thoughts on a blank sheet of paper and retrieve them later. On the other hand, this academic in training (PhD student) never prints out journal articles and keeps these in the Cloud:

And then all of my kinds of thoughts of like structures and diagrams and charts, I write as well. But all the reading, all the journal articles, I download and file away kind of on my cloud. I never like print out journal articles and stuff like that.

I'm very paper based, I jot down a lot on the side, and that's just kind of my set up.

And then I have my like thoughts and frameworks and things and that's a big A4 notebook, and that's kind of a mix of like papers. I grab like that piece of paper if I have an idea in that moment, and then like the actual paper that's in that book, like that's meant to be in there. And it's just a wild mix of things.

Interestingly, interviewee #41 is made aware during the course of the interview of her practice of carrying all of her printed documents in her backpack at all times. This seemed to surprise her somewhat, especially since she considers herself to be otherwise sensitive through her research to the possibilities offered by technology to avoid carrying heavy loads and have documents available through various devices and services:

Sorry, I didn't realise, yes, I kind of didn't think about that. Yes, I carry everything around in my backpack. All of these, you know, books are like the

heart and soul of my PhD.

So, but I don't use that, I don't ever access that, no. Everything I carry... What's important is in my backpack.

Q: Okay. So does it get heavy or is it...?

A: I don't know, I think it does. A lot of people tell me that my backpack is very heavy. And I know I'm very old school, and I study technology entrepreneurship so it's a little sad that I'm paper based, but it's just my system works well for me. It's just, yes, it's just how I work.

In Figure 32, interviewee #41's "set up" is visible with notebooks on the table and the open backpack on the floor next to the chair.



Figure 32 – Interviewee #41 at her workstation with notebooks and backpack visible (Author)

Interviewee #46 describes a process where notes, ideas and conceptual maps are captured on blank sheets of paper which then get digitized and classified for future reference. The manuscript is then kept at hand for the current project for which they had been produced. Once this purpose is fulfilled, these sheets of paper are discarded. This last step is possibly to avoid confusion when looking for these manuscripts as has been expressed by one other academic-in-training (PhD student) – interviewee #48. Interviewee #46's process is in stark opposition to the one described by interviewee #36 who prefers to start a document on-screen, whereas interviewee #46 prefers to

begin with blank sheets of paper. In both cases, the various possibilities offered by ICT were explored and the process which worked the best for the individual in question was retained:

Q: No, the question is rather do you...? I mean perhaps you do, but I mean do you, when you read the hard copy articles, do you write on the hard copy? Do you actually annotate them or do you...? And then...?

A: No. For me, I think better if I write and, I don't know... And, for example, this is somehow how it works, I'm doing, let's say a research project or a consultancy project or whatever, you're reading a lot and you're taking notes. And sometimes you take a blank sheet when you read a lot and then you have to, okay, I'll try to make sense, and you do some map, some conceptual map or whatever, you play around with ideas on a blank sheet. And if it's good, then, ah, this blank sheet is good, and you save it in the bucket with all the rest of the documents. And then the times come when you have to write it down because you have to prepare the paper or do the consultancy report, then you digitize what you already, I don't know, physically... For example, you had a paper with notes, those notes probably are complementary to the blank sheet where you have the summary, and then you take all that to digital, and then you can throw away the rest. And that's typically what I do. I have a blank sheet where, I don't know, I had some summaries, some ideas, some mental map, whatever, and then I write it down when the time is necessary. I don't know. Because I see that the digital version is more like... Of course you can play with it and change it, but for me when you go into writing a document, it's harder to play with it... It's easier to play with it with ideas and changes on a blank sheet. Reading papers in your mind, you have more degrees of freedom, whatever. When you are already writing something, you have structure, whatever it is, an introduction, an analysis, a conclusion, whatever, but that's kind of... So I prefer to go into a document and write it digitally when I am ready. And if I feel it's okay, then I throw away all the... And I don't care too much about the papers that I have notes on it, or the summary that I had on some blank sheet. That's the process.

Interviewee #42 explicitly cites the limitations he feels when using software for visually exploring concepts and ideas. This is not the case with blank sheets of paper, where he feels his imagination isn't constrained. Like interviewee #41, this academic-in-training would carry a bundle of sheets of paper in his bag so that these manuscripts could always be at-hand.

A: Oh, I forgot to mention ATLAS. So I'm doing my data analysis using software as well which has severely helped in keeping track of all the massive data set of interviews and data analysis. And I also do some visuals on it as well, so I try to visualise how different concepts and themes connect with each other, but I feel that constrains my imagination. That's why I always do it on paper. When it comes to visualising things, it's always paper. So you'd see me going around with around 20 or 25 different sheets of paper, having all my models on it and it helps me keep track of my thinking better than software would, I feel. So, for me, digital

is about having immediate access to it and enabling the visibility and dissemination of it easily, but that's not to disregard the role of paper in helping me retain that memory, or helping me think...How shall I put this? In putting forth my ideas in a more consistent manner, the way I have it in my mind, it helps to do that much more easily and immediately than digital would.

Q: Okay. And where do you keep this paper?

A: With me, in my laptop case. I can show you upstairs if you want.

Finally, a group of four interviewees (#25, #33, #39, and #48) who feel much less affinity to paper than the rest at JBS. Interviewee #39 contrasts his practices with those of his wife regarding paper, which he finds "bizarre" because of her need to work from hard-copies for every sort of document. He prints as little as possible and likens it to preference such as drinking coffee with or without sugar. This is an interesting analogy, given this academic describes having made the move to minimizing paper as part of his work practices as to "go cold turkey". This suggests a difficult – almost physiological – adjustment to working without paper:

Q: Do you do a lot of printing?

A: No, I don't actually. It's funny, my wife prints everything, so she has to come up and print. You know, people send her a document to review, to read, to whatever, she'll print it before she can read it. It's bizarre actually. She still writes out letters long hand. You know, when she's working on papers, when she's, you know, writing papers she'll print a version and read it, work from that and then kind of print another one. No, I really don't. I print as little as possible. I just force myself not to use very much paper and it's fine. I think it's... people have preferences, but it's a bit like a preference for coffee with or without sugar, you know. You go cold turkey a bit and you train yourself and then you don't need it anymore, you don't even miss it, you know. I'm a believer in that actually. There's nothing innate about a need to print or not to print, you know. I think you can habituate yourself I think quite easily.

Q: How do you annotate if you have a paper read? What do you do?

A: So because I'm doing... so if, I guess if the person I'm working... so if I'm working with co-authors or if I am reviewing something or for example if I'm reading my PhD students' work, then I will write comments in the margin, yes. So in other words online, so I use, you know, the comments stuff in Microsoft Word. So you always use tracked changes. I think that's really helpful. So I use that technology a lot and it's, you know, simpler actually. It really does the trick I think. I often don't... you know, I find it confusing too. So what I'll do is I'll write comments, I use tracked changes, but the visual version I work with is the one where I say, you know, look at final version or something. You know, I don't want to see it all when I'm going through it, but it's all there. You know, then I click it on and have a look at what's happened afterwards and then send that off.

Interviewee #39 contradicts himself by saying on one hand he finds annotations on-screen simpler than paper, yet complains about the confusion this can produce. He then

reveals his need to print certain types of documents – ones for tasks he feels less motivated such as reviewing articles. He feels that by printing these documents and having them at-hand and visible, he will be more likely to perform the reluctant task:

If I'm reviewing... the exception to printing is I think when I get a document to review, a paper to read for a journal, I typically print it off, partly because like a lot of people, you know, I'm something of a... I do quite a lot of reviewing, but I'm always quite reluctant because there's always something I want to do that's more selfish to me that I want to do instead of the review. So if I've got the paper there I'm more likely to pick it up and also I think there's a sense sometimes that you can just kind of skim through something to get like an initial view of something quicker on paper and then I go deeper into it. And then I will scribble on the paper. So that's the only exception. I don't really know why, but yes.

This above passage also perhaps suggests interviewee #39 has been constrained to working on-screen much more than on paper due to his very nomadic work practices and not being present at JBS on a permanent basis. He seems to consider paper copies better for skimming text when compared to on-screen.

Interviewee #25 only prints his own work when it is mature enough for editing. He feels this task is perhaps better undertaken on paper. He otherwise will read and annotate documents on-screen.

Q: So not a lot of printing then?

A: Not really. Only when the paper is converging to... and you know, you need to fix... only when I really refine, you know, but not much. Pretty much I never print to read other papers. I will print say only to edit my own paper.

When interviewee #25 reads and annotates on-screen, he will occasionally do so on his smartphone. He tried to do so on a tablet, but found this experience disappointing. He also suggests a long process – a few years – to do the transition from paper to on-screen.

Q: Apart from your laptop, you mentioned a laptop, do you use your smartphone for anything?

A: No, and I regret, you know, buying an iPad. I thought I would read more papers on the iPad. Didn't really happen. I mean, I still prefer the laptop. Yes, but one thing I've got used to on the phone is to read papers on the screen, but before I used to need hard copies. But it took me a few years, but now I mean I can do everything, you know, on the screen, including annotations and things like that.

Q: What do you use for annotations in terms of...?

A: Well, here Windows, I use the Adobe, the Acrobat, and I think at home I have a Mac as well, where I use... the default software on Mac allows you to annotate. Yes, that...

Interviewee #25 has also discovered the benefit of reading e-books on a reader such as Kindle. He cites the pain of carrying hard-copies of books back and forth between the home and the office.

Q: How about reading books. Where do you read books?

A: Kindle.

Q: Okay.

A: Yes. It's been a long while that I actually bought, you know, a hard copy of a book. So again, I converted completely to Kindle, the reason being that I find much easier to highlight, you know, plus you don't have to carry back and forth. But one thing is sometimes the only kind of work that I do from home is I will read the book in the evening, and that was painful, you know, every day to carry back and forth. But yes, Kindle saved a lot.

Interviewees #33 and #48 have both described a process of moving from paper to paperless work practices for different reasons. In the case of interviewee #33, ageing is cited as having deteriorated his eyesight for which using the possibilities of magnifying documents on-screen – on a tablet – has been a solution:

As I aged, my eyes are not as strong, and I do like to simply use my tablet and magnify it, at a will, with fingers, so that's also helping to see the value and the benefits of being paperless.

However, the above passage betrays a sense of convincing oneself of the advantages of working on-screen after feeling somewhat constrained to do so by other factors. This could explain why this academic describes practices such as the following which are in total opposition to those described by his colleagues at JBS:

Or, you know, if it... Especially if it's a very large, like, if it's a large document or if it needs careful comments, reviewing papers, editing papers, then it's easier online.

Interviewee #48 provides the perfect example of a process of going from paper-based work to paperless with the reasons for each step. This academic-in-training (PhD student) expected ICT to reproduce the possibilities for annotation available when working with printed documents. However, she was quickly disappointed, finding many PDF files to be locked and annotations not-permitted. Once this obstruction was lifted by subsequent innovations in ICT, interviewee #48 found a solution in completely working paperless for reading and annotating articles:

But my problem was always that I hated it if I would have some articles printed, and some articles highlighted on screen, because... Yes, this is something I really... This kind of thing I kind of need a structure, otherwise I'll get totally confused. Because then I would be looking for an article, and I would look

through the printed articles, and then two hours later I would realise, oh, I didn't print it because I have it like highlighted on screen, so... But, yes, so that's why I switched completely to like not printing anything anymore.

Interviewee #48's solution of working paperless for academic articles is apparent by the relative absence of paper documents often seen on other academics' desks (see Figure 33).



Figure 33 - Interviewee #48 at her desk (Author)

One of the most important and time-consuming activities for academics is data analysis. Although not an absolute necessity, this task almost always requires specialized software, whether it is for qualitative or quantitative research. This requirement, as opposed to readily available software package tools such as word processors or spreadsheets, present a certain material, and hence spatial, constraint in the practice of data analysis. Often for licensing reasons – these software packages are very expensive – they are only installed on the office workstation. As interviewee #44 puts it quite simply “I'd say that I'm, kind of, wedded to my desk when it comes to the data analysis”. This is despite having tried possible solutions liberating him from this constraint:

Q: Don't have to get into the detail of how you prioritise your tasks for the day but I mean... Perhaps what can be interesting for me would be are there certain tasks

that you prefer? Or do you plan your day in a sense, in a way that you can do certain tasks in one place, other tasks in another place; so on so forth for whatever reason that would be.

A: I'd say that I'm, kind of, wedded to my desk when it comes to the data analysis; not data analysis but cleaning data and having to, like, manipulate big databases and that sort of thing. While I'd love to, kind of, to do that remotely, I find that the remote connection that I have with my laptop isn't the best so for example if I was to... If it was seamless I probably wouldn't even stay in the UK, I'd probably go back to Sydney or go to some other part of the world where I'd just work through my little portal on my laptop. But because that connection isn't so good I'm, kind of, stuck at my desk here, basically. I'll end up spending the majority of my day, sort of, manipulating this data set and getting it all... Getting all the data in one place and building the variables that I'd need for my analysis. Then I'll say that's, kind of, interspersed with emails and contact with the team that I have in Bangladesh about like...

Interviewee #32 goes into more detail regarding the reliability issues he encounters when trying to perform computations using MatLab remotely:

Q: Okay. But would you be able to do the exact same thing that you do on your desktop here, on your laptop without, let's say, a connection. Like, if you were outside the range of Wi-Fi.

A: Almost, almost. But then it's slower, and the computer screen is smaller, and sometimes central software packages probably stop working. For example, I also use MatLab to do computations, and then occasionally, I can do it on my laptop by remote desktop. But sometimes it just stopped working, and then that's not so good. But I suppose this type of service will be improved, so in the future it will be the same.

Similarly, interviewee #26 prefers to do data analysis in the office due to latency issues when connecting remotely. He also, like interviewee #32, cites the enhanced ergonomics of having larger screens at the office as a factor:

And, secondly, I am not very keen on, for example, remote computing. Now, so what I mean is, of course, in [inaudible], I can work from home, I connect myself to the internet here, and even, like, use remote desktop to work on whatever I need to work on in the office, but I found that rather slow, actually. I tried that before, but I found it rather slow. I tried that before when I was on a trip or something, I found it rather slow. So, what sort of task would require me to work on a remote desktop? That would be like, for example, data analysis. So, for example, I need a certain software package to do data analysis, then I wouldn't have it on my computer, I would have it on the computer here, and I'll have to remotely log on to get into that software to work on it—it was a very inefficient process, as I found out. Based on limited experience, I... Afterwards, I just decided, if I want to do data analysis, I will prefer to just work here, where I'll have bigger screen, quieter environments, and just everything seem so much more comfortable, especially when I am engaged in very intensive data analysis.



In the three instances above regarding data analysis, there is ample evidence of frustration in trying to work remotely with specialized software packages installed on the office computer. Although possible – all of these interviewees have tried – the solution turns out to be unworkable and therefore not even considered an option when choosing where to do data analysis.

#### *4.2.2.1.1.1.2 Unspecified*

As mentioned earlier, academics are looking for ways to optimize their productivity by taking advantage of gaps in their schedules, perhaps during transit on a train or bus, to do some work. Given the nature of these blocks of time – usually short and in less than ideal conditions, with distractions such as noise and movement – the tasks undertaken don't usually require much concentration such as scanning emails or other text such as articles from online news outlets. ICT presents new opportunities for filling the gaps in time and space.

Interviewee #45 will take three types of devices – a smartphone, a tablet and a laptop when travelling – but will use the smartphone when on the move such as on the train:

Q: Alright, um, and do you have any, um, in terms of, when you're moving, when you're commuting for example, or you're away from Cambridge, uh, how do you, do you actually bring your laptop with you to work, do you, what do you do to be mobile and still be productive? If, if that's the intention. Maybe you don't want to be productive, I mean, when you travel.

A: No, please, how say, actually do [inaudible] I do travelling last month. I bring my laptop. I try to do something to make it productive? But the thing is, I mean, I just so tired, I don't have to do that, but I still bring, um, I still, how say, download some PDF to my phone, so I can read during, during the train. Not like, because laptop I have, is very heavy, and it take time, but I can't look at it every time I want, so sometimes, if I go travelling, I will do both. I will bring a laptop as well, as commonly it's, I used that very, in the last time, but I always download some PDF to my phone and I can read it. Also I, um, install like, uh, Word, Excel, in my phone? So I can just tap like that. Also I have, I bring my iPad? I, I buy a keyboard for my iPad as well, so it syncs like, um, connecting to laptop so I also install same software on it and I can tap.

Like interviewee #47, interviewee #45 feels that laptops don't lend themselves well to work on the train. She cites bulkiness and latency in terms of performance. The smartphone remains the ideal tool to stay productive while on the move. This is strongly felt by interviewee #42 who seems to be able to perform any task on his smartphone:

Q: So I'll start with just asking you very simply how you organise your daily routine spatially.

A: I'm going to have to say that technology not only mediates, but creates my organisational reality every day. So I do everything using phones. I'm all about having every part of my work digitally enabled and on the go. So I would check e-mails, I would write e-mails, I would use Office on the phone, I would just keep working wherever I am.

So for me space is not confined. It's not about boundaries, it's everywhere. That, of course, has a lot of consequences for my health, might I say. And for obviously... It just increases the amount of work that I do even though I don't realise that, but I like to have that visibility, that immediateness, that comes with not having a confined space for working.

Q: Okay. And how seamless is that? I mean how do you...? If you...? Do you actually limit some types of work to certain places or devices?

A: Even though... Yes, sometimes it really depends on the type of work that I do. Sometimes if I'm really that much into my research, it doesn't matter where I am, as long as I can... I use Dropbox to have everything synchronised across my devices, so the... So it's seamless and integrated in that way.

For me space is... Sometimes the office is good when I want to concentrate on something and just do something quite quickly, but when I want to be creative and think about something a bit further, the office somehow kills that for me. I might go to a coffee shop, I might go somewhere where there's a bit more going on around me, that helps me a lot.

Q: Okay. So the ambient environment is...

A: Sometimes for specific tasks, but in all of that... All of that is seamlessly integrated so everything that I do is in Dropbox; I can start it on my phone and then I can finish it in my office and then I can view it on my desktop at home.

What is striking in the above passage is the sense that this academic-in-training (PhD student) feels the need to have his work at hand at all times regardless of where he is. He uses the term "immediateness" to describe this desire. This is made possible by Cloud-based storage solutions such as Dropbox. Interviewee #48 also benefits from Dropbox to allow her to work on her laptop during seminars that she finds boring:

Q: Okay. So you bring it in to the office?

A: I bring it in but just for... I mean I'm not working on my laptop in the office, I just use it, you know... For example, if we have a PhD research group I'll take my laptop to there, you know, I don't know, to be able to check e-mails in between. Or if we have like a super... I mean we have some seminar series organised by the business school, or by our group and sometimes... I mean obviously it can never be directly... Not every presentation can be directly linked to your research interests, and sometimes within a week, you have many different seminars or paper presentations, so I basically just use my laptop to go there but then do some of my own work in between. So it's just like my mobile, I mean... Yes. Because you never know when you are called to attend like one of these lecture series, so I tend to always have my laptop with me to make sure that if I have to go somewhere, and I realise it's super boring, then I can work on something else.

Q: And how do you synchronise between your devices?

A: Oh, Dropbox.

On the other hand, interviewee #48 didn't feel her smartphone to be of much use for work purposes while away from her computer and would rather limit its use to personal purposes such as calls and messaging. This decision is due to her disappointing experience with emails and the fact that there isn't enough space for Dropbox on her smartphone:

Q: And what about your smart phone? How do you use that? If you do.

A: I don't use it at all for work. So I don't synchronise my e-mails on my smart phone, not my private and not my like work e-mails. I basically only use it for like WhatsApp and calls and text messages because I never... I mean I tried at the beginning but then I realised it really doesn't make sense at all for me, because for most of the work e-mails, I would need to save something. Or like if I would check my e-mails when I get home, I would, on my phone, and then I would still need to, I don't know, save a certain document that was attached, or reply to the e-mail with a certain document attached. And these are all things I can't do with my smart phone because then I would need to have Dropbox on my smart phone and there's not enough space. So I decided I'll never, I just never check my e-mails from my smart phone because then, if I do, and the next day I'll check my e-mails in the office, I might miss the ones I checked already but I didn't actually work on them. So that's... I'm basically only working on my e-mails if I can actually work on them, if I have my computer and my documents there. And otherwise I try not to check.

Interviewee #46 feels he can be productive in bed with his smartphone. When sleep isn't forthcoming or is broken earlier than usual, this academic-in-training (PhD student) will turn to his smartphone to do some quick reading of papers or glancing at literature on a specific topic.

Q: You mentioned the iPhone, do you use that for work?

A: Yes, I use it to browse through the literature. Not to read. Sometimes when you are, I don't know, sometimes you get... Typically I wake up at six, six-thirty, but sometimes, I don't know, your brain starts working earlier and you get up at, or you wake up quite early, for example, but you don't want to leave bed. I then just turn it on and just have some reading, quick reading, just the introduction of papers or in general. But what is really useful is to fill some, I don't know, gaps that you have within the day. Sometimes you are waiting for something or, I don't know, or you're getting to sleep and you, I don't know, you just are really sleepy or whatever, you have some ten, twenty minutes gap and then you can... For example, if I'm working in a project, I want to see, to scan the literature which is really important, and typically I go through Google Scholar and then you just use the cell phone to go through the papers and then I... Just to keep track of what I'm doing, if I find something interesting I send them to my e-mail and then next day, in the e-mail, ah, yes, this is what I saw yesterday. And then I systemise it a little

bit more. But the iPhone for me is for work. Of course you use it for a tool, to answer some e-mails when you are, I don't know... You use it for communication but that's not all that relevant, for me it's much more the flexibility that you have to do that literature search.

Interviewee #46's intimate relationship with his smartphone isn't limited to his bed. He also feels he is able to manage the emergence of ideas using his smartphone by turning it into a sort of "memory offload".

And the other thing that I've been finding more useful now, is that... It's like you kind of float some ideas that you have that probably, since you are in the middle of... Ideas come up really unexpectedly. For example, I was in a class now and I had this idea there might be a research project because the teacher was saying something. And probably in my experience in the past I would say, okay, I'll remember that and then in two years' time, in two days, or a week, I'll try to go back and say, ah, I know that I had an idea but what was it? And I really couldn't remember. So now what I do is sometimes I get these ideas and I just do a quick note in the iPhone, and so I can store these ideas.

And, for example, now I find that useful because I have to... There are a lot of things... In a lot of the courses I have to do some short paper on research ideas, or even for my thesis for the dissertation, I'm playing around with some ideas, so in the iPhone I have like, I don't know, 10 or 15 now, short sentences with some ideas. Probably I will go through those ideas in a month's time or when I have to, and a lot of them will be really, I don't know, not useful, but some of them will be, ah, okay yes, that's good. So it's kind of a memory offload.

Interviewee #46 also feels he always has his work at hand thanks to Google Drive – even in the event of a laptop theft. This provides him with a double sense of security, one regarding the fact he can access his files anywhere he has a connection to the Internet, and two, he is much less worried about the theft of his laptop knowing his work is stored elsewhere.

Q: Okay. Did you...? I didn't see if you had a laptop here, is it a laptop or is it a...?  
A: No, I work with... I have a... It's just for comfort, I have a laptop in my desk at my house, at the apartment, and I have... I'm working everything within Google Drive so I don't have to bring my laptop everywhere. It's more comfortable to, I don't know... And I don't mind using different keyboards or different screens, I'm not too picky. Some guys don't like that and always have to work on the same, but for me, it's the comfort of not going around with the laptop is much higher than the cost of changing the keyboard and whatever. But that's new, I've been using that like a year ago having, working everything within Google Drive. And also it's easier for your psychological safety, because you know that that won't be lost, it's in Google Drive and somewhere it will be, and so you don't have to be kind of... Prior to that I was kind of... Once a month I had to back up all the information and be careful. And I was bringing my laptop everywhere and that was kind of annoying and sometimes you get worried about... If you had to leave your desk, your laptop somewhere, you said, oh, if I leave it somebody will steal it or

whatever, you will lose a month's work. And sometimes that was kind of a psychological problem. But now with Google Drive it's like... And actually I see now, for example, that the value I attach to the laptop is infinitely more, the information that is within it, than the, I don't know, what it can do. You can always buy another laptop. And prior to shifting to Google Drive, I think that you tell me, how much does your laptop value? Oh, a lot, a lot, I will be able to pay a lot for that. Now, it's like, I don't care, just take it, go ahead, I don't worry. So you'll have to pay a little bit for a new laptop, but you just don't... It's kind of, I don't know... I don't worry too much about the laptop now. I don't know, prior to that if my kid's playing with the laptop, he might throw [inaudible] or something, I was really worried. Now it's like, okay, just play around.

Interviewee #30 feels his smartphone is his main all-purpose device from which, with a few exceptions, he can have all of his work at hand. Larger devices he finds impractical for working on the move.

Q: I don't see you have a laptop, but do you ever bring any devices with you to those meetings? Do you ever need to plug something in or...?

A: Rarely. I rely on my phone, because the phone is...You know, I can access anything I need to. Well, there's a partial exception, because it doesn't work very well with certain aspects of the Intranet. That seems to be...It's not just the phone, it's the tablet as well. I don't know why that is. It will access the Intranet, but if you try and download a .pdf from link, it just somehow doesn't work. But apart from one or two glitches like that, I can do everything on the phone. And I can take notes on the phone, so that's usually enough. I mean, I find carrying around anything else that's bigger is just a bit of a nuisance. So, you know, I treat the phone as my, sort of, main all-purpose device.

Interviewee #30 would take advantage of any 'gaps' in the day to read on his smartphone or tablet. He would prefer the tablet for visualizing diagrams, but feels the phone is perfectly adequate otherwise. Taking advantage of these 'gaps' are so important to interviewee #30, he would download documents to his devices as part of a stack of reading material for occasions when he wouldn't have access to the Internet.

Q: Okay. You mentioned a tablet and portable devices. You mentioned also using even the garden, I presume at home? Is that the garden at home?

A: Yes.

Q: Okay, would you use it in any other place?

A: Oh, yes. I mean, if I go to London, which I do reasonably often, I will usually take the tablet with either e-books or other documents on so that whether I'm on the train or the tube or just, you know, have gaps, I can just read off there. Or sometimes on my phone. I mean, the phone is small, but it's perfectly feasible to read on that. It's just that with diagrams and things, the tablet's a bit more, kind of, effective. But that's partly about, you know, trying to use time that otherwise might not be very useful. There's always an infinite amount to read, so I always try and make sure I have some of it available, either online, you know, or often, if

you're out of Internet range, then I've always got stuff downloaded ready to read to keep me going during any gaps.

Interviewee #35 ferries her laptop between home and office depending on what tasks she feels she needs to do at home in the evening or over the weekend. However, Dropbox allows her the freedom of dispensing with this inconvenience – transporting a heavy laptop – should she be in a hurry or have minimal work to do at home.

Q: So, perhaps we could start by having you describe a little bit how you organize your workspace. And when I say workspace, I don't mean necessarily just the workspace in the office, but just generally, broadly speaking.

A: Okay. So, the central element of my workspace would be my laptop. So, basically, here, as you can see, in my office I have my laptop which is plugged to that screen. And basically, when I need to take it home, I have my laptop at home. And I also use a lot of Dropbox. So that if I'm in a hurry and, you know, I know that I won't be working very long in the evening at home, I leave my laptop here and, you know, on the computers at home I access whatever I need from the Dropbox.

Q: Okay. And in terms of technology, I know you mentioned the laptop you have, and I presume that's the only...You did mention the home computer and that you can retrieve your documents via Dropbox and everything. Actually, that's a good question. Why wouldn't you always be on your laptop? Why would you work on the home computer?

A: I try to buy laptops that are not heavy, but I find it quite heavy for me to carry my laptop around. So if I know that I'm ... don't need anything special from it, I don't take it.

Q: Okay, so you would leave it in the office?

A: I leave it in the office. So over the weekend I'll take it back, and during the week, you know, maybe I'll take it...This week I took it home twice. Otherwise I try not to carry it too much around. And otherwise, here on top of that, I have a PC, that you can't see. And I access it remotely, because I'm using a Mac, and unfortunately, not everything runs on Mac, and I haven't had my Mac partitioned. I know that many of my colleagues have the PC system on the Mac. I haven't had that done. So I still remotely connect to my PC, and I can do it from either the office, or from any computer, so I can also do it from home.

Interviewee #35 uses various devices depending on task (reading articles for example) and how each measure up, especially regarding screen size.

Q: Okay, and what other sorts of devices would have, other than this laptop? Do you have a smartphone?

A: Yes.

Q: Tablet, iPad, or anything?

A: Yes.

Q: Okay, and in terms of work, what would you use them for?

A: So, the tablet, I don't use it for work. Or, if I use it for work, it's just to basically access a paper online.

Q: Okay, so you would actually read it from the tablet?

A: Yes, but I don't read that very often. In that case I would rather do it on my laptop, because I have an iPad Mini, which the screen is quite small. So I prefer my laptop for that. And my phone, I use it primarily, you know, to manage my calendar and reply to a lot of emails. That's what I do, and file and find some...I have Twitter, so if I an Economist article that I like, I'm going to put it aside for later for my students or whatever. Yes, I think that's pretty much it.

Interviewee #41 finds the smartphone to be of limited use for various reasons. Firstly, she is limited in terms of material due to the risk high-value devices present in the field in Kenya. This means she is unable to install Google Docs or save attachments in emails. Furthermore, she feels smartphones don't suit typing replies to emails and will only read them on a smartphone and reply from another larger device.

Q: No, it's very interesting. Sorry. So even for, I don't know, if you're looking at a Google Doc on your phone, you wouldn't do that on your phone, you'd do it on...?

A: I don't even have Google Doc installed on my phone. I can't even open... I have a super old-school smartphone and a further reason is because in Kenya it's... You just don't want to be walking around with a fancy phone, so part of it is just kind of knowing, okay, I go back there a lot, it doesn't make sense.

So I can't even open an attachment, like a pdf or a Word attachment. I can read the e-mail on my smartphone, which I do actually, but then that's it, I can't open, yes... And I never respond on my phone either because I just don't want to make typos or... I prefer to see the screen, yes. So I really... I use my phone to check my e-mails early in the morning when I kind of get up, but that's about it. Just so I know what's going on.

Interviewee #36, who uses the Cloud to store documents, provides a perfect example of how each device fits each of the tasks he associates with certain locales – be it the office, the kitchen at home, a café, or the bus on the way to work.

Q: So we'll start very simply by just you describing to me a little bit the way you organise yourself in terms of space for work. So generally, yes your own space.

A: Independent of research collaboration, just simply where do I or how do I work?

Q: Yes, very generally how do you...? Yes I mean, where you work?

A: So I like working out of the office, I would be in most days. When I'm in the office I work at the desk. I used to drag my laptop in thinking I might, and I say this in theory, you know do half day in the office and half day in a café. That would be rare other than if I say had to get a paper review done, if I had an AE report or a reviewer report due then that would get me out of the office for a few hours, you know no Internet in the café. So if I really needed to focus on one task then you know I'd disappear off to a café, be around people but not have to talk to anyone and not have the distraction of the Internet, otherwise yes, most of the time in the office. I would usually do some emails at home at night-time or anything pressing, so often things like teaching prep. Like at the moment I'll end up finalising lecture notes the night before on the kitchen table on the laptop.

Apart from that, what else do I use? I got an iPhone a couple of months ago and I would do email clearance on the bus on my way in. That's probably my working pattern as it is with IT yes.

Q: Cool, I saw you have an iPad right?

A: I have an iPad and an iPhone 6.

Q: Okay when you go to the café let's say to work on... What do you do at the café, you read?

A: Generally just reviews.

Q: Okay would you work with your iPad or what would you work with?

A: No I'd print out the article, have all the printouts and then just type it into the laptop. Occasionally since you ask actually, I'll also use Dragon for reviews or student feedback, particularly student feedback. I generally try and organise myself so that I can just dictate it into Dragon both because it's easier and I have to say it's also a way of creating more feedback to the students in less time. So I think that it's a win-win from that point of view.

Sorry I've forgotten your...?

Q: Dragon is interesting, you would do it here?

A: I have Dragon on my work computer and on my home PC. I would only ever use it at home on the kitchen table or in work. I don't use Dragon in a public space.

Q: Okay when you mention kitchen table, you also say you have a PC, is it a laptop?

A: It's just a laptop.

Q: Okay so you don't have a home office, you don't have a designated space at home?

A: I used to, with the arrival of Fin who's now two. So two and a half years ago I lost my study.

Q: For good reason there.

A: Absolutely.

Q: Okay and actually that's interesting, would you find that for that reason you tend to spend less time at home working or doing less work at home?

A: I never, even pre-Fin was ever really a big one for working at home. I just like being in the office, I like this is work and this is home. I don't necessarily manage that distinction as well as I'd like, but I think when I'm at home it's easy things that I do. It's you know just chunking through emails or simply tasks, the things that require a bit of thought are in the office or in the café.

Q: Actually that's a good question with the Cloud, when you're at home and you're working on your laptop do you have any specialised software that you need that you wouldn't have at home?

A: No not particularly, I use Dropbox so I always work off Dropbox. Work has a...

Q: That's what you mean by the Cloud, Dropbox is the Cloud?

A: Well the bucket or whatever, all the Cloud services. So I've got Dropbox and Evernote, they are probably the main two actually.

Q: Okay.

A: But I think Dropbox was the thing that really was great because then I didn't have to be carting files back and forth on memory sticks and the like. So yes that's what I would mean by the Cloud.

Being a frequent user of the train service between London and Cambridge, interviewee #39 expresses his disappointment with the promise of being able to work on emails or



access online material during journeys due to the poor reliability of the Internet connection. He therefore adjusts his task to take into account this constraint.

Q: You mentioned wherever you go there's the Web. Do you have a mobile connection? I mean do you...

A: I do, yes. So it's not particularly good and again it's one of the things that really annoy me about privatised rail network that, you know, it's returning all of that shareholder value to shareholders. And the Cambridge-London train the value of the people on that train being able to get access, you know, to UK products. I mean it's probably millions of pounds a year, you know. You've got train loads of people stuffed full of kind of... and they can't get on the Web. I think it's disgraceful and it will cost a few tens of thousands to rig up every single train with Wi-Fi, you know, you know it would. So, sorry, it's not relevant to the interview, is it? So the point is, yes like everybody else I struggle with intermittent kind of, you know, link ups and they're not very good. So I try and avoid it to be honest, but every so... yes, so every so often I really need something, I take my chances. But, you know, I normally find I'm in an edge area and I can't pick up 3G. So, it would be hugely helpful for me if I had continual access. What I try to do and do is yes, so rather than doing lots of stuff involving surfing or, you know, pulling down emails or whatever, I'll check my emails on the phone which has come on, you know, via the mobile network and I will work on... if I'm working on the train I will work on a document or something. I'll do a review or something which doesn't need Web.

Although interviewee #32 feels able to work anywhere in the world thanks to his laptop and a Virtual Private Network (VPN) connection to the office, he prefers to stay in the office for writing. He adds that he prefers the office generally since his workstation has two screens and he can refer to his collection of books which are visible in Figure 34.

Q: Okay. And do you have any tasks or... I'm trying to think... Yes. Tasks or activities that you prefer to do, either in the office or in specific places like the home, or wherever you might find it?

A: If I need to write a lot, I prefer to work in the office. But nowadays, I think... What is it, a VPN? I don't know the full name of that. So that enables me to work at home or anywhere in the world. Basically, I can log in to my desktop from my laptop anywhere in the world, as long as the wireless works well. So in that case... And I can work like I'm in the office. But the laptop screen is smaller than the office computer screens, so I still prefer to come here to the office. And furthermore, I've got a lot of stuff here. Books, and papers, etc., to help me to do work more efficiently.



Figure 34 – Office of Interviewee #32 (Author)

Just like interviewee #36, interviewee #45 finds the surroundings environment, coupled with the possibility of surfing the Internet, a distraction. This was also observed at McGill. Interviewee #45 finds herself affected by the behaviour of those around her and will modify her physical environment by wearing noise-cancelling headphones to prevent conversations from distracting her:

Q: OK, OK. And is there anything about this PHD room and this building that, um, that's helpful for that? For, for your, or is, I don't know, distracting or that you find is not helpful for...

A: Yeah, I think is much helpful because, um I don't know if you know the previous one, it's very a big room and I sit just beside the door. And everyone come I would look for, just look at them. Just, just I cannot stop. I know it's not my business, just cannot, I just every time the door just open I will look at them, and, um, also nobody around me, just one desk there. So sometimes I think, oh, because I, oh, use the computer, so sometimes I just surf Internet. I just cannot, how say, stop myself? But I won't here. Because someone study around me, I think, oh, I cannot just surf on the internet. I should do some serious thing. So just can focus on my study. But, um, I think though, the worst thing is, um, people will talk to each other, because we know each other, so we can talk to each other, something like that. So, sometimes, if I want to focus on something, maybe a little bit difficult. But I use, like, noise-cancelling headphones? and that's much helpful. Yeah.

Interviewee #37 sees e-mail distractions differently depending on the task. He generally feels he easily jumps from one activity to another if it doesn't require a significant amount of concentration. He would specifically shut down his emails when he feels he needs to minimize distractions for writing for example. He feels distractions such as email can also be a factor depending on how well he can maintain concentration. Should it not be going well, he admits to feeling tempted to check emails as a form of escape to avoid a difficult task.

Q: So what do.... What does that mean in terms of getting emails and getting [inaudible]?

A: Getting emails, there's often a range of sort of administrative activities or dealing with journal reviews, for example, that have to get done, and the question is whether you do what... Is sort of compartmentalising things, sort of whether you do those things that sort of interleaved or in sequence. I've never been particularly good at maintaining rigid sort of separation of things I get. I tend to do things when I remember and they're fresh in my mind, otherwise, I tend to forget them, so there's often a lot of sort of jumping between activities.

Q: And how... You mentioned about the computer, so I'm just curious to know how... So, you get an email, you get a notification, you get... Would that get your mind off the task you're on? Or do you have a method or way of...

A: It depends how... I suppose, two things. One would be, how sort of significant the work that I'm doing. So if I'm trying to write something and it's important to me that I spend some time devoted to it, and that gets distracted, then I will switch off the email and I will try to focus on that exclusively. It also depends, sometimes, on how well that process is going. So, sometimes, it's very... Well, it's not very easy, but it's easier to write, things seem to be flowing, you got some ideas and you want to get more to get them out, and then, you're in the flow, things just seem to function more smoothly, and the distractions are less significant. Sometimes, when you're really struggling with things, you're always looking for excuses to try and do something else, and so [inaudible] an email comes in, even if you're not particularly interested in that, you might look at it.

#### *4.2.2.1.1.3 Writing*

Although writing is a significant part of an academic's work, only two instances from interviewee #47 were specifically referring to this activity. Like interviewee #37, interviewee #47 finds she needs to control her physical environment as much as possible to reduce potential distractions when she writes.

Q: You know distraction of some... Anything like that?

A: I mean just a simple thing that sometimes I decide to... When I work in my room I decide to turn off the wireless. Or like... I usually work with a... Like a cable that connects the YouTube. So I turn it off, and then sometimes I switch it on again. But usually it's... So when I write a paper let's say, then I would know that you know, for the next two or three hours, like I don't really need to check my emails so then I can turn it off, and I don't get any notification as well. And here

obviously I can't really do that because it's always switched on. But then you don't get notifications there so it works.

Q: Okay.

A: Yes but... That I do sometimes.

Q: Okay. And to... Would that translate to perhaps one...? In terms of you feeling having more control over your environments I guess, at home compared to here.

A: Yes.

Q: Especially the tools that... Is the PC you have here is provided by the university grant?

A: Yes.

Q: Okay. How much control do you have over...? I mean are you able to personalise...? Not personalise but configure the notifications and all that? Or is it really locked down?

A: Yes I mean... I don't know if it's just because I don't know about it. Or if it just that it's not possible. I haven't changed anything. I'm not aware of how to do that. But it... I don't think that there are that many options with free, standard software. I don't think you can even change it to getting notifications but I'm not sure.

Q: Okay. It's Windows?

A: Yes.

#### *4.2.2.1.1.1.4 Taking a break alone*

Interviewees have often mentioned the importance of breaks for socializing or disconnecting from their work. Interviewee #32 not only disconnects from work, but also from the Internet and devices by taking breaks in a nearby garden when he feels tired and needs to reenergize.

Q: Yes, yes. Actually, I just had one question, you mentioned going to gardens and you mentioned Pembroke. Do you stay connected? Do you have a device that allows you... Or do you... Is it, is it important for you sometimes to not be connected, and have...

A: No, in that case, I prefer not to be connected.

Q: Okay.

A: Because when I go there, it really means I'm tired. I need to have fresh air, so I go there.

Q: Okay.

A: Otherwise, if I'm energetic, I don't want to go there.

Q: Yes, okay.

A: Yes.

Q: It's to get energy.

A: Yes, yes.

Q: Yes.

A: Yes.

Q: Okay.

A: Because around lunchtime, so when I'm tired.

#### 4.2.2.1.1.1.5 *Teaching duties*

Academics also spend significant amounts of time preparing course material, such as slides, and evaluating student work. Interviewee #36 cites a very specific way in which ICT helps in liberating him from the office when looking for material for his teaching:

Q: Okay. Any thoughts, yes I don't know, about space here, your workspace, your practices, technology, anything that you can maybe?

A: So we talked about the Cloud before, I think that has definitely given a lot more flexibility to the way I work. Particularly for teaching, you know an article appears on the Webpage... So what I used to do if I really wanted to keep a copy, you know I would copy and paste it into a Word document, then it would get lost in the computer and I would never find it. But now with like Evernote I can pull off the entire Webpage in its original form with one click of the button or do word searches. So things like that where I can create my teaching pack basically anywhere, that is what I was saying about working at home. It's no different to working at my desk, if I use Evernote I've got any of the examples that I need to pull from and all of my slides are there. So I think that's definitely helped a lot. If I think back to the early days of my career I'd feel much more bondage. Everything was at my desk at work so I was kind of stuck. But I don't think I've taken full advantage of the flexible working that I could actually do, it's sort of what works for me. What else would I add, space and IT use?

It is interesting to note that for many of the academics at JBS, the smartphone was visibly placed at-hand on their desks. The following photos in Figures 35 to 45 are for interviewees #24, #32, #35, #36, #37, #40, #41, #44, #45, #47 and #48 respectively, with the device circled in red and magnified.



Figure 35 - Office of Interviewee #24 with smartphone circled in red and magnified (Author)



Figure 36 - Office of Interviewee #32 with smartphone circled in red and magnified (Author)



Figure 37- Office of Interviewee #35 with smartphone circled in red and magnified (Author)



Figure 38 – Office of Interviewee #36 with smartphone circled in red and magnified (Author)



Figure 39 – Office of Interviewee #37 with smartphone circled in red and magnified (Author)





Figure 40 - Office of Interviewee #40 with smartphone circled in red and magnified (Author)



Figure 41 - Office of Interviewee #41 with smartphone circled in red and magnified (Author)



Figure 42 - Office of Interviewee #44 with smartphone circled in red and magnified (Author)

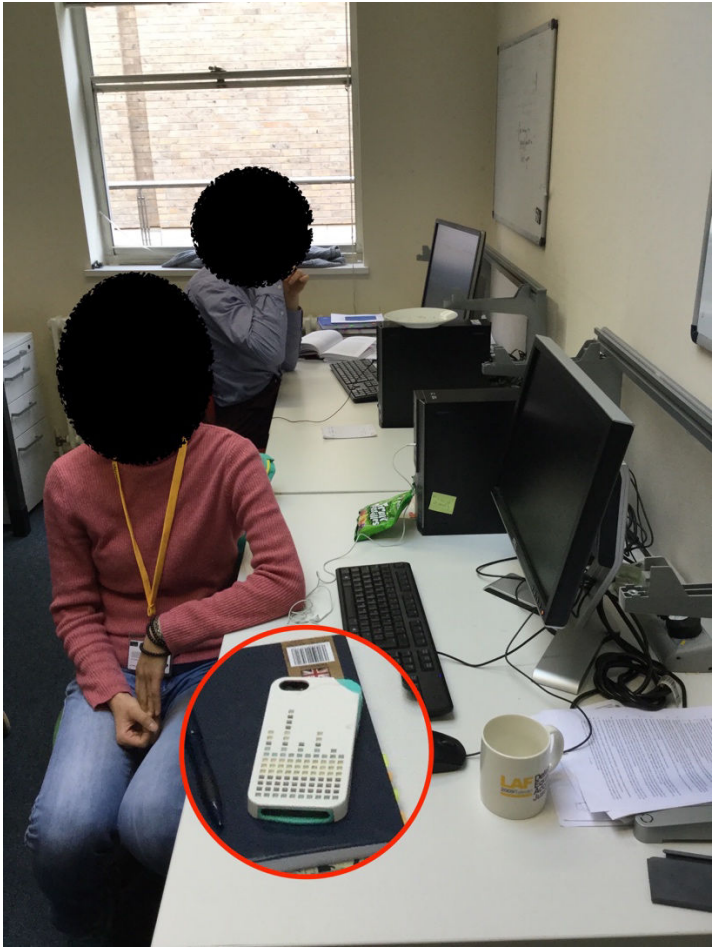


Figure 43 - Office of Interviewee #45 with smartphone circled in red and magnified (Author)



Figure 44 - Office of Interviewee #47 with smartphone circled in red and magnified (Author)



Figure 45 - Office of Interviewee #48 with smartphone circled in red and magnified (Author)

#### 4.2.2.1.1.2 Collaborative

Collaborative work, in contrast to individual work, necessarily involves the interaction of several academics and is usually mediated by some form of ICT. Although email is a standard tool for collaboration, many academics cited experience with Cloud-based collaborative platforms and the results are mixed. Interviewee #41 found her experience working on a collaborative platform allowing many authors to work on the same document disappointing. She felt that co-authors would be able to change the document without much visibility on what was deleted or added. She eventually reverted to sending versions back and forth by email to be able to keep track of changes made by co-authors based in Kenya. Interviewee #37 seems equally unimpressed with this capability of Cloud-based solutions for co-authoring and prefers to relay the document back and forth with co-authors so that what each is doing to the document and their ownership in time is clear. On the other hand, he finds Cloud-based storage very useful as shared repositories for references and data.

Q: What about tools like Google Drive, or... That allow you to work on the same document?

A: There is a Dropbox folder for one of the projects. I find them more useful as a sort of repository, rather than as a sort of shared documents, just so you got some common reference base for what you're working with. I don't find writing with people at the level of this sort of detail of the document necessarily very productive. So, I would prefer to write something, get somebody else to write... To take that material and incorporate into what they want to write, because I think it just makes for better writing, and as things develop, tweak and adjust that. But I think that's... It's generally, [inaudible] one person who is taking ownership of the current state of the document.

Occasionally, as in interviewee #48's case, the co-authors cannot agree on which Cloud-based solution to use and end up reverting to using email to collaborate:

Q: Okay. And this is strictly by e-mail?

A: This is strictly by e-mail. So we try to do interesting... Like for the Addenbrooke's project we tried to do Google Docs, but I hate Google. Like I hate... Like I find it super user-unfriendly, like I never find something in Google and I don't use Google mail. And I do always... I do everything in Dropbox and Michael doesn't like Dropbox, and I don't like Google Docs and he has everything in Google Docs, so we basically figured it out that on this side we can't work, we can't find a way to work together. And I guess we... I would assume that we would continue working on the document like this, but that obviously means we have to keep like very strict deadlines in terms of, I'll send you the document kind of by Saturday morning, and you send it back to me by Tuesday evening. So I mean because we can't work on it at the same time, but for us it works fine

because we always like keep to our deadlines, or we try to keep to our deadlines and it helps us structure the process. So I would never think, oh no, now I sent the document to Michael and now I can't work on it anymore, because basically this is how we scheduled, so for the, I don't know, for the two days in between, I would just basically work on something else. And then once he sent it back to me, I would continue working on it.

In some other cases, the Cloud-based solution would end up not being used for unknown reasons as interviewee #47's experience shows:

Q: Okay. And would you use any tools like... Do you... Collaborate software?

A: So for... With my MPhil supervisor I... We did use Dropbox for... [Inaudible] more like a [inaudible] that he had, and then we never really used it. This guy like... We tried for one week but then like... Yes it wasn't really used in the end, I don't know why. So we... Yes that didn't really work out, but apart from that, not really.

Q: So email?

A: Yes, it would mainly be email.

Q: So you'd send back and forth? [Inaudible].

A: Yes.

For others, the experience has been the complete opposite and the use of collaborative platforms like Dropbox are very intensive such as in the case of interviewee #25:

Q: Do you use Google Docs or any kind of tools that allow you to...?

A: Dropbox.

Q: Dropbox.

A: Extremely. I mean, that had been extremely useful with co-authors and even teaching because before, you know, I had the USB stick every day. I had to remember and I would confuse the versions. I mean, it sped up things tremendously. Yes, I guess that's the only tool that I've been using a lot.

On top of echoing somewhat the experience of interviewee #25, interviewee #32 also mentions the feeling of not having to be co-located to collaborate when compared to the past:

Q: Okay. What... I presume when you write papers and you collaborate with other researchers, what proportion would you say are co-located, so here, Cambridge, and outside of Cambridge and sort of distant?

A: I think it depends on... Nowadays, you don't have to stay in the same place, the same location. Because we have Skype, so I use Skype a lot to collaborate research. And well, this afternoon, I will have one. And also, we have like, Dropbox, so that it's easy to access, to update the work you have done or your collaborators have done.

Q: Okay. And actually, when you do use Dropbox, how do you coordinate, let's say if you're working on one document, do you segment the work? Do you... If you're working on the same file, how do you actually organize and coordinate?

A: There are different systems in the world, okay? Just over ten years ago, I used

something called Virtual Control. And actually, you can work on the same file and... I mean, in different locations on different computers. And the computer system can record different versions. So... But nowadays, because we don't have that available here, because people have to pay for that, then we just use Dropbox, and then Dropbox... We probably say we just create a new file. And then if you have smart names for your files, say, proper name in the beginning and proper days in the end so everybody would find it okay. And when this was written, and who actually wrote it, etc.

Q: Okay.

A: And of course, you have a good system about Dropbox. For example, for each collaborator or each paper, you should have a sub-folder, and within each sub-folder, you have other sub-folders, etc.

On the other hand, interviewee #46 explains how the co-location of a consultancy project team enhanced the experience of using the collaborative platform Google Drive. This academic felt that coordination is easier when a team is co-located to work on a document simultaneously using a collaborative platform.

Q: Let's talk a little bit about collaboration. So you... I mean without... I mean not necessarily about any specific project, but more in general, when you collaborate on different projects with other people, how do you organise that? How does that happen?

A: Oh, that's super... It depends, case by case, it's different, and in my experience it has been really different with different co-authors. I'll stay within the co-author collaboration. I've been collaborating on consultancy projects and then that's different. We have many, a larger team, I don't know... Google Drive or Dropbox is always useful, centralising everything in one place. I was a member of, I don't know, or leader of a consultancy team that we had a one year long project and we were four guys working on it. And Google Drive was super helpful, we just had everything in it, you are working real-time on the document, everybody is seeing what you are doing, and so it's really helpful. And in terms of space in that project we had, we were four, and we tried to be together in the same room. That's useful to, I don't know, go around and ideas flow easily.

Interviewee #36 believes that collaborative platforms allow for centralizing references and documents for access by co-authors, which was not possible with email, although he isn't convinced it has made him more effective.

Q: Okay so over that time what, or even going back further if you want, what have you noticed that's changed as far as...? Well what has changed, just you know in terms of work practices?

A: If I think about the group of people that I would usually work with, things like Dropbox where we can... So I'm thinking about pre-Dropbox when everything was emailing files back and forth and there's kind of a cost to doing that. Both keeping track of the file, renaming it and everything else, but I think it also limits the amount of information that you would share with your co-author, it has to be more structured. What can I fit in an email? Whereas if I think about the folders

and the way we work now even for a preliminary project that I'm sort of scoping out with a colleague, we've got a shared folder. We just throw stuff in there and we'll both put articles, newspaper cuttings and whatever in that folder. It's kind of the repository and I think that I do that a lot more with co-authors now. We'll have sort of the shared articles or whatever it might be. So I think the ability just to share more information probably doesn't mean that you're necessarily any more effective, but at least it's on hand for that particular project. Everything that you need everyone has access to I guess. For example it might used to have been, Benn you've got the EndNote library, I need this reference or I need this and it created a lot more back and forth, whereas now everyone can just pull from that central set of information.

#### 4.2.2.1.2 Non-ICT

Many instances supporting the triadic causal cycle without explicit mention of ICT were found in the data. It is possible some of these instances are somehow connected in a causal manner to the findings in the previous section regarding explicit use of ICT. In any case, these non-ICT instances can be useful to provide autonomous evidential support for the triadic causal cycle and also check the impact of ICT against other factors in explaining why academics organize their work in time and space in certain ways. Likewise, these instances can often imply ICT as part of the explanations provided by the academics interviewed. They are divided into the two sub-categories regarding the type of activity: individual and collaborative.

##### 4.2.2.1.2.1 *Individual*

For individual work, almost all of the academics interviewed would compare their home and office environments for how conducive they were for work. In most cases, the office was the preferred location for focused work, but some also cited other locations such as cafés, libraries or gardens for quiet and uninterrupted reading.

Interviewees had different perceptions of what sort of working environment their homes offered. Most found working at home difficult, due to the distractions such as chores and family. Others would find home not allowing them to get into a mood for work and many would try to separate home from the office in terms of work. Interviewee #40 feels more motivated to work in an environment where others are working when compared to home where this motivation is less forthcoming.

Interviewee #43 finds home too small to work comfortably and likes to keep it work-free. Both interviewees #26 and #37 feel the presence of their respective families would not allow them to focus. Interviewee #37 says he would have difficulty to “cut myself off”. Interviewee #33 has found the solution to this problem by converting a shed in the back garden of his home into a study so that he could write in isolation. Interviewee #47 would find quiet times in the morning to work at home when the family is still asleep. In complete opposition to each other, interviewee #34 feels she is able to do her best writing at home due to a lack of distractions, whereas interviewee #35 would never feel able to work from home due to the distraction of chores.

Going to work in cafés was an option cited by interviewees #36, #42, #43, and #44. For interviewee #42 the environment at home and in coffee shops is more amenable to thinking “independently” and reducing the stress of being around other people doing the same type of work, such as in the office. Interviewee #43 goes to cafés to read papers and for a change in atmosphere as long as it is not too noisy. Interviewee #44 specifically cites the popular café Hot Numbers nearby because he likes the ambience and vibe there. He also implicitly cites ICT as making this a possibility.

A few others would go to work in libraries for some very specific tasks or occasions. Interviewee #37 likes the Cambridge University Library because there are printed copies of journals or books that are unavailable online. He also likes the relatively quiet atmosphere and likes to set himself goals associated with being at the library during a certain timeframe. Interviewee #43 will swap a café for their college library on occasion to change, but shuns the JBS library due to the noise. Interviewee #40 also dislikes working in the JBS library without really knowing why. Interviewee #45 also shuns the JBS library and prefers to go on occasion to another library further afield where she enjoys the feeling of not being recognized and where everyone else is focused on their work.

Various other third spaces emerge as places where work can take place. Aircraft are mentioned by both interviewees #24 and #35. Gardens or green spaces are favourites for reading for both interviewees #32 and #44, especially during the summer season. Hotels during business trips are where work is done. Interviewee #35 would bring work



only when not accompanied by family and interviewee #34 would ensure to get a separate room in a suite to be able to write. Interviewee #33 will take advantage of his summer trips with family to Canada as a work “retreat”. Interviewee #41 would alternate between the office and the Gates Scholar’s common for more “inward focused” work and associates this place with that mindset. Interviewee #46 goes to the common room to read books because he feels more relaxed there to absorb new or difficult material

#### *4.2.2.1.2.2 Collaborative*

Only two non-ICT instances were found for collaborative activities of academics. Both dealt with where meetings would be organized and why these locations were selected. Interviewees #26 and #35 both cited the common room of the JBS as being unsuitable for hosting visiting researchers due to the noise. Both preferred their respective offices for conducting conversations with other researchers on the substance of their work. On the other hand, interviewee #35 feels the common room to be suitable for more casual contact with other researchers and would spend more time there if the food were better.

#### *4.2.2.1.3 New Categories*

Some new categories were generated by the coding of the JBS data: Business school context, Food, Faculty struggle for office space, Sensuality, and Changing landscape of BS (Business Schools).

##### *4.2.2.1.3.1 Business school context*

Although only one source – interviewee #33 – generated this category, this single reference provides a trove of information regarding the types of factors driving growth in business schools and the effect it has on academics and space requirements.

Q: And what it means for research in [inaudible].

A: Yes. Okay, well, certainly, I would say, it’s a lot things going on. Business schools are becoming more popular, for example, with undergraduates, just to take one example. In other words, there’s a lot of market drivers. You know, there’s... You could say, yes, it’s the university itself, and that, they’re obviously hand in hand, are seeing business schools as both cash cows, because of the number of programmes that they can generate and often at premium prices, but

also, as I said, there is increasing numbers of students studying management as an undergraduate discipline, which you get a lot of. Despite the graduate work, we all like that, there's... You know, undergraduate populations are really crucial in terms of numbers, and so that is increasing dramatically. And so the interest, both from students sort of demand, and the perception, I think, of both jobs and entrepreneurship, which is more appealing to students as a graduate, even at an early age, is driving interest in business schools. But the administrators and the top management of universities often see business schools as offering a way to bridge deficits, of bringing in more money to help the centre. And so will be supported, or will encourage, or will want to both expand the business schools, and when you get down to the business school level, there is also, by virtue of it being business school, in inverted commas, attracts. And the expectation is that people want business leaders, and many others... Many wider sets of stakeholders are more actively involved in business school than any other department. And all of that creates a whirlwind of sort of interest in expansion or in doing lots of new activities. And therefore, the... Or the potential to be stretched is quite significant in terms of meeting the stakeholder needs, whether it's your undergraduate students growing a lot, to your board members that think they would love to have X, Y, Z, to the university administrators that consider the business school as, you know, the flagship going forward to both in terms of numbers, in terms of bridging revenue to cover deficits. And that has a big impact on, you know, what spaces are built and for what purpose. And there is a big problem as well, I think, in many universities, as to how faculties outside of the business school, including administrators, understand what a business school is about. And it's not often understood that they do research in the way in which, certainly, they do research. And so, there is more of a potential for a predilection towards schools offering services rather than research. So they are service to the rest of the university or service to the community, and that's often betrays, even implicitly, an understanding that there is a research core that needs to be nurtured, harnessed and protected, in terms of space.

#### *4.2.2.1.3.2 Food*

Although not unique to the JBS – lunch breaks were cited by McGill academics as well – food came up remarkably frequently with interviewees at the JBS. There are 29 references for this category from the JBS. This is most certainly in part due to the history of Cambridge University itself as explained by interviewee #31 when discussing collaboration at the JBS:

Also, it's not just the chance in itself it's also the fact that, you know, food is quite a good way of bringing people together. One of the interesting things maybe for your research is to know that the idea of common table is very important in Cambridge. People may not be able to articulate this really clearly, they may just feel it, but the colleges when they were originally invented, one of the core ideas was that, you know, there should be shared eating facilities. And people should be, not quite obliged, but they should feel a responsibility to actually eat together. So, you know, dining rights were actually really important, at the heart of the

fellowship of the colleges. And the idea is that people from, you know, across different disciplines meet together, you know, once or twice a day, sit down, break bread together and talk. And typically what they will talk about is what their work is and so on. And it's through these kind of, interactions that, you know, the kind of, interesting ideas emerge, you know, where you're playing off physics against economics or, you know, anthropology against, you know, biology or botany or whatever. And one of those kind of, ideas about, you know, what makes Cambridge special, is this kind of, interdisciplinarity being kind of, quite strong. The conditions here are very good to enable people from different backgrounds and different disciplines in particular to talk. And you don't get that in a lot of universities, you know, because of the way you kind of, are required to organise yourself, you know, you have to have these kind of functional compartments, I suppose, for work. And thinking about your, you know, your focus on research, I think it's particularly true in the way that research is going now. It's becoming ever narrower and the kind of people that you need to talk to, to do your particular, you know, work to a particular level in, you know, whatever discipline you're in, you need to narrow down, narrow down. You end up just kind of, communicating with three or four other people who happen to be experts in that field, you know. The peer review that kind of, goes on is done by people you kind of, know even though it's supposed to be anonymous you know the people. So it's this ever kind of, narrowing focus on particular subjects, or sub-categories of particular subjects. But we then have this way of organising at a place like Cambridge which is actually quite good because it creates the conditions for people to step back from that narrowness and actually think quite broadly about their kind of, issues and problems. And that's, I think, sometimes where people get the best ideas, that's in my view, I think, yes.

Many of interviewee #31's colleagues found the current arrangements for food at the site to be mediocre and were keen to have hot meals served in the new part of the building as part of the site expansion project. His colleague, interviewee #26, says

What, I mean, the common room should improve its food, but then everybody knows that. It should be... The food should be better quality for money, it's too expensive and too bad. I mean, I keep saying that.

Another one, interviewee #30, says:

The most attractive thing is the prospect of a proper restaurant, which we badly need. I mean, the weakness of this building, I think, overall, actually, is the facilities. I mean, there are way too few toilets, at least for men. Maybe women as well. And the café... Well, the food facilities, I don't know if you should blame that on the building or the way it's run. And I don't mean the people who run it day to day, they're great. But the overall, you know, food and drink offering is very poor, and the new building is going to have some kind of proper restaurant, where, I believe, there'll be, you know, hot food and a decent salad bar and stuff like that. Which, I think, these days, with an organization of, what, I don't know 200 people? How many work here? That's not unreasonable to expect something like that. So that will be good, I hope.

As the site expansion project documentation titled “Our Vision for the Site Expansion Project” describes it:

A 160 person dining facility is also located on this floor. The dining space is envisaged as a focal point for interaction between the users of the building and will complement the existing Common Room.

Unsurprisingly, the lunch break is seen as a focal point of the day, especially for socializing, for many of the academics. Getting and eating a meal with colleagues and getting out of the office comes up in the interviews mainly when discussing collaboration. For the PhD students, it is a key moment of their day, not only to take a long break, but also for bonding and getting advice from more advanced students as in the case of interviewee #40:

Q: Well, with yeah, at lunch time when you're not in front of your...

A: So, lately, uh, with some PHD students, I'm very close to one of them, and uh, I mean in terms of, he's in the same group of me, and I think he has very good advice, so sometimes I talk to him about, you know, some research aspects and what I want to do, uh, some of the things that, you know, uh, I want, I want to ask my supervisor, but because this PHD student has more experience than me, he has already published and everything, um, he can give me some advice, and it's like pre-, pre-,um, -discussion with my supervisor with him, and then I can talk with my supervisor about it sometimes. So we can exchange ideas, um, for example I had a small text I wanted to send to him, I sent it to him, he sent me, uh, um, a conference paper he want to send and I'm reading it, so sometime we exchange this. Sometime we talk about, oh, what did you do yesterday evening, so dinner, uh, uh, what did you do with your, your uh your friends, and uh it's, so at the same time research but also social sometimes. What are you doing? Uh, what have you done? What are you expecting to do during the weekend? These kinds of things.

Interviewee #40 feels he benefits so much from these discussions at lunch time that he is trying to organize regular lunch meetings with other PhD students from other fields in order to exchange ideas and give each other feedback on their work. Interviewee #48 makes sure she always takes an hour break for lunch and makes an effort to not eat alone.

More senior researchers – not PhD students – at the JBS would also make the effort to take a relatively long break for lunch with colleagues. Interviewee #24 would go to the Common Room for the lunch break and try to find someone willing to join him. However, interviewee #33 feels that the Common Room – the only location where food is available on-site – is not well suited for exchanging ideas and long conversations. He

says it discourages in-depth exchanges and cites the college facilities as better suited for this purpose. Unfortunately, being located far from the JBS site, these college refectories are impractical for many of the colleagues at the JBS according to him. Interviewee #36 likes to get out of the building for his lunch break and also join colleagues in the process if they are available. For interviewee #35, most of the social interactions in the office occur during the lunch hour when she meets with colleagues, and like her colleague, interviewee #36, she likes to get out of the building. She also thinks the site expansion plans will be beneficial for exchange of ideas, meeting unknown colleagues and social interaction during the lunch hour:

So I think once we have the new building, we will replace Downing by whatever cafeteria we would have that would be able to prepare some hot food. That would be better, because that would be a place where, you know, I decide to go by myself, I know that, you know, even if there's a colleague that I don't particularly know, but, you know, it's an occasion to kind of get to talk to people. And maybe find a new subject of interest or, you know, learn about their research. Even if it's very different from what I do, I think it's still interesting to hear about that.

Since interviewee #38 is mainly based at home for work, he will arrange to always have lunch with someone whenever he comes into the office. He feels they are opportunities to get many things done with colleagues instead of relying on emails.

#### *4.2.2.1.3.3 Faculty struggle for office space*

Interviewees #25 and #26 both expressed a certain frustration faculty had with the current building and conditions with regards to space. Interviewee #25 describes his experience with his office space since arriving at the JBS, especially the struggle to have a “proper office”:

I mean, this is, the [inaudible] building is an interesting one, but it's definitely not very functional. Like, I've been... this is the third office that I changed and this is really, you know, I've been extremely lucky to get this office. But I know other colleagues, like I was, in the first two years I was in that fishbowl, you know, extremely noisy then. Then for another two years I was on the ground floor, just facing the parking. But that was also very noisy. I think most faculty here struggle with the office space. But for us, it was a very big problem to just have proper offices and that's... so the first thing is that, well, hopefully the new building will solve that one.

Interviewee #26 also recognizes the specific design of the building means those who have offices facing the interior atrium area with just a glass partition – hence the use of the term “fishbowl” – have a negative perception of the building:

I think people’s perception of the building here has partly to do with what sort of office they have, is just has a [inaudible] effect on you. So, I happen to have an office which actually faces outside. And if you talk with people who have office that face inside, they may have very different perception.

Both of the interviewees refer to the context of business schools described by their colleague, interviewee #33, specifically regarding the increasing pressure on space due to the significant growth in programme offerings and numbers of students. Both also express a certain expectation the expansion of the JBS site will alleviate these pressures and make the experience of the space more pleasant for the faculty.

#### *4.2.2.1.3.4 Sensuality*

As equally observed at McGill, academics at the JBS often referred to light, noise and temperature as part of their assessment of comfort for work at the office or elsewhere. This would be above and beyond the issue of ergonomics of their workstations such as screen sizes or the comfort of their chairs. The appeal to the senses of certain spaces would have an effect on the experience academics at the JBS on a daily basis. Interviewee #24, like interviewee #35, particularly appreciates the bright colors of both the interior and exterior, the Common Room (Figure 46), and the bright atrium space (Figure 47).

Q: And how do you feel about this building?

A: The building is designed to be open, right? So the common room is a great social space. It's a very inefficient building, probably because you could have squeezed many more offices in, I'm sure, if you wanted to. I'm glad it is what it is. So the building design is great. I like the building very much. I love the colour of it. I love the space of it. I love the fact that you can look all the way up to the ceiling, you know, from the downstairs, six floors up. We'll see what the extension does, but the building itself, I think, is generally a good place to work from. It's a nice place to work from.



Figure 46 - Common Room at the JBS (Author)



Figure 47 - Atrium space at the JBS (Author)

On the other hand, interviewee #24 seems to reinforce the impression of his colleagues that the design of the building contributes to the pressure on space and is not fit for purpose. Interviewee #32 laments the fact that there isn't an enclosed garden for breaks on-site, however takes advantage of the gardens in the vicinity when possible. This academic, like others at McGill, appreciate the possibility of getting fresh air on a regular basis. In the following extract, he compares his previous workplace to the JBS.

On the other hand, they also have a garden. And then because I like to have fresh air, almost every day, I went out to sit outside, to review the teaching materials, or to have rest, or to do something else, etc. So if I had an opportunity, and I did... And here, probably we have... Even though we have a lot of gardens here, but then they are far away. So I cannot go out here, there is no garden here, I cannot go out over there, but occasionally, I do go to Pembroke, because Pembroke's close. So if I feel tired at lunchtime and I need some rest or fresh air, I go to Pembroke and sit down over there.

#### *4.2.2.1.3.5 Changing landscape of BS (Business Schools)*

In the following extracts from the conversation with interviewee #24, we get a good sense of the changes and pressures facing academics in Business Schools and their consequences on how they organize themselves on a daily-basis. The feeling that relationships have become more 'transactional' seems to be related to the forced absence from the JBS site. We see this academic feels the pressure to take on teaching duties which require long-distance travel and long periods away from Cambridge. To further exacerbate the situation, he feels the need, like many of his colleagues, to live further and further away from the school given the increasing cost of housing in the center of the city of Cambridge. The site expansion plans, mostly driven by demand for space from expanded executive-level programs, will mean the loss of parking for faculty and compounds their difficulties in terms of commuting. All of these factors, at least from the point of view of interviewee #24, combine to produce increased absence from the office. His feelings seem to be shared by his colleagues, interviewees #29, #33, #38 and #39:

I think generally everyone has gotten busier, right? And it means that probably people are less around than they use to be. For various different reasons also, I think the culture of the place has become more transactional than it used to be. That's not universally true, but I think by and large, partly as a result of some of the people we've hired, partly as a result of the fact that we've grown as a business school, and partly the fact people aren't around as much as they used to, you know. Some people are, but [inaudible], and they're kind of distributed. So you've got some people in finance. They aren't in this building. They're in a



different building on Trumpington Street, and you have people in...Some of my colleagues that aren't [inaudible] house. And so, not to be co-located has some impact as well. It'll be interesting to see what happens when the extension gets built, right? Probably in a big piece at the end, and this office will be a toilet, so. I'm going to lose the office, but you know, get something else, I'm sure. It'll be kind of interesting to see what impact that will have. I mean, there's some very nice colleagues at the Judge, you know, and when we are together we socialize, we talk in the hallway. Sometimes the 10 minutes that we chat away about something silly, that can make your day, you know? And it's really unfortunate that it's not happening more than it is. And a large part of that is my fault, because I'm just not in as much as I should be. And sometimes, just to get the benefit of connecting with other human beings makes it worthwhile going in to the office, you know? But I look in my diary. There's just so many days I'm just not physically here. It's just hard to do. So I find it frustrating. I need to do the work that I need to do, partly because of the money, and partly because some of it is interesting, but you pay a price.

Q: What do you think of the extension project?

A: I've seen the plans a little bit. I don't quite remember. I know that this is going to be a toilet, and I think there's going to be a kind of quasi-executive suite at the top. It will be a compromise, like so many things, right? So nothing will be perfect. It will just be a compromise. I have no strong views. There will be no parking. I think that is going to be an issue for some people, because we have colleagues that travel in from places that are almost a bit too far to cycle from, unless you really like cycling.

Q: Do you cycle in?

A: I walk, usually.

Q: Walk.

A: I could cycle, but I need to get my cycle fixed. But I'll walk in. Sometimes I'll drive and walk. So I drive near my old house and then walk here, like this morning.

Q: Just remind me, where exactly do you live?

A: It's about half an hour walk. It's in Cambridge, but on the other side of Cambridge. Sometimes when I do executive teaching in a suit I don't like...When I don't like to walk, I park here in the back. But that's just me being lazy, you know. The walk is not a bad walk, it's fine. But there are people that have to travel further, and they're going to be affected by the fact that there won't be a single parking space. I'm all for getting cars off the road, in a way, even though I violate that ideology, because I drive myself. But I feel sorry for some colleagues that will have a harder time. It may mean that they just won't come in as much as they do now, because there's nowhere to go. There's nowhere to leave your cars.

#### 4.2.2.2 Analysis

The analysis of the findings will be similarly structured as the findings themselves, however only at the level separating individual work and collaborative work. These two types of work will be considered according to whether ICT is explicit or not.

#### 4.2.2.2.1 ICT

##### 4.2.2.2.1.1 *Individual Work*

Working with paper for disseminating (reading) and augmenting (annotating) knowledge is an ancient practice for academics going back to the beginning of the University in Medieval Europe. Illuminated manuscripts would be read and annotated by scholars, then used to transmit knowledge to students. Scholarly texts would also be read and analyzed in much the same way as religious texts, albeit with different objectives. Disputations would be organized by the masters to publicly debate interpretations of scholarly texts (Charle & Verger, 1994). These practices endure to this day in more modern forms. Scholarly texts – journal articles – are read, analyzed and annotated by scholars. They continue to be used to disseminate to the wider community and transmit knowledge to students. Conferences and workshops are organized to present and discuss texts amongst scholars. Paper has been the traditional medium for this practice, however the possibilities offered by ICT allow for many channels for the production and dissemination of knowledge by the contemporary scholar, including in business schools.

Instances of academics working with paper is not a repudiation of the possibilities offered by ICT, but in fact just a manifestation of these very possibilities. High-capacity printing, print job queuing, batch printing and sending print jobs remotely are all features of contemporary print facilities in most business schools, if not all. As Jules Verne correctly predicted more than a 150 years ago, paper would be ever more important in technologically advanced societies (1994).

Each body instantiates an affordance in conjunction with the physical environment. Documents are available in electronic format, but can be transformed into paper very quickly at the office (less so at home). Some trial and error in practicing reading and annotating on-screen results in some new affordance being perceived or not, adjustments are made – in accordance with certain constraints (ex. reviews must be submitted electronically) or some opportunities taken advantage of (scanning hand-written notes to put them in the Cloud) and these modifications in practice change the physical environment – hand-written notes are now available through devices

connected to the Internet or a house garden is transformed into a place for reading (perhaps a chair and a table are added).

Whether it be paper or on-screen, the academic wants to feel they have their documents at-hand. This perception seems to be what academics tend towards and the body is central in making this happen. All the references cited in the findings regarding this individual academic practice of reading, analyzing and conceptualizing, provide, to varying degrees, evidence supporting the triadic causal cycle. They do so by telling a story – occasionally implicitly – about incremental changes in practices and physical space in relation to ICT, and what role the body had in this story. As far as the choice between paper and on-screen is concerned, the academic tends towards that environment where he perceives important documents to be at-hand. The stories can be structured following the triadic causal model:

1. The physical environment changes (including the insertion of ICT or changes in the body) and it **instantiates** a set of affordances not yet perceived by the academic
2. The academic **perceives** the affordances either through chance, training or watching others
3. In engaging in a **practice**, the academic will experiment with the perceived affordance – perceived as benefiting the practice – hence shifting the practice
4. Depending on the result of the experiment, the academic will durably **alter** the physical environment with the shift in practice or **maintain** it as it is

In each step, the body is either involved in instantiating an affordance, perceiving it or changing the physical environment. A good illustration of this step-by-step process is the case of interviewee #33 and his deteriorating eyesight. We can recognize each step in the data:

1. The academic's body changes with deteriorating eyesight. This is perceived by the academic. The device on which he normally works allows him to magnify the text. This therefore instantiates a certain affordance for the body of the academic in this physical environment.

2. The academic perceives the affordance either through chance, training or watching others
3. The academic then tries to read using the magnification feature and continues since he feels he is able to read more comfortably
4. By using the magnification feature, perhaps the academic will prefer to use a tablet to read articles and therefore change the location where he reads (such as the home garden), or perhaps he will purchase a larger monitor for his workstation. In both cases, the physical environment is modified.

It can even be argued that in the above case, the physical environment was already modified in step 3 since by magnifying the text, the script as it is spatially represented on the screen, is modified.

Another excellent illustration of the step-by-step process for the triadic causal chain is interviewee #48 and the story of how she moved from being paper-based to mostly paperless. In this instance, there is more than one iteration of the cycle:

1. The academic's physical environment changes with the insertion of ICT instantiating the affordance allowing her to read on-screen (but not annotate)
2. The academic perceives the affordance, again either through chance, training or watching others. However, she also expects to be able to annotate on-screen
3. The academic tries to read on-screen and annotate and realizes annotations are not possible. She reverts to reading and annotating on paper as before
4. By reverting to paper, no further changes to the physical environment beyond step 1 are affected
5. The academic's physical environment changes with an update to the features of ICT, instantiating the affordance allowing her to read and annotate on-screen
6. The academic perceives this new affordance, again either through chance, training or watching others
7. The academic tries to read on-screen and annotate and realizes it is now possible to work without the need for paper
8. By no longer needing to print as much and mostly working on-screen, the academic modifies the physical environment by reducing the amount of printed

matter in her workspace along with the organizational and logistical demands for producing it (printers, energy, transport, paper processing plants, etc.)

All of the other references in this section describe the same step-by-step process, albeit with many variations. The resulting changes to the physical environment may be incremental, however when the practices are entrenched and many individuals adopt them, the impact on the physical environment can be quite significant.

Interviewee #37 prefers paper documents and books because a certain relationship to the artefact is possible which is not possible on-screen, with the result of him needing space in his office to archive and sort (piles of paper on desks). Interviewee #47 feels that reading from paper is better than working on the laptop in the train so she will print documents before travel. This means a certain practice with consequences for the physical environment which would be the reverse of the case for interviewee #48 mentioned above – as in more paper, energy and requirements for space. Interviewee #36 likes handwritten notes, but eventually scans them and stores them in the Cloud. Like interviewee #48, this implies, in terms of the physical environment, less need for space for storage and sorting, and information available on devices anywhere there is access to the Cloud.

The fact that, for many academics, paper seems to afford something that is not available on-screen has implications for the physical environment. Interviewees have cited hand annotations, highlighting, touching the artefacts, knowing where one is in reading the document, and being reminded of something by the presence of a visible artefact. The need for printers and space to store the documents remains. Some academics – interviewee #43 for instance – also like to have paper documents visible at their workstation. However, ICT has also pushed people to find other solutions for storage, such as the Cloud, which implies changes in physical environment as far as where information is available and how (on-screen). For example, those who start with handwritten notes and end up scanning them to store in the Cloud – interviewees #36 and #46 for instance – need scanners to do this.

For some, the spatial freedom offered by paper is contrasted with the constraint of ICT in terms of mapping ideas and concepts. This means having paper on-hand and carrying this paper around, as is the case for interviewees #41 and #42. This means there is an intimate contact with paper and having it at-hand is important. The effect on the wider physical environment is less clear, but the body is certainly affected – the weight of bags for example as mentioned by interviewee #41.

Regarding the body, it is interesting that interviewee #39 mentions how the process of moving from paper to paperless was akin to going “cold turkey” and says he had to “force myself”, indicating the difficulty for the body in adjusting to the new practice. This could be due to the combination of lack of office (a certain physical environment) and frequent travel (a certain practice) that has imposed the change, and this tension is somewhat suggested by the interviewee. It is a tension which may exist with other interviewees, such as #25, #30, and #33.

Smartphones are recognized as being well suited for certain tasks in third spaces or at times that are considered ‘gaps’ in the day. They change the physical environment and provide new opportunities to do work in spaces other than the office or home. This affordance is perceived and gives rise to the practice of working on the move and putting aside certain tasks for certain periods during the day – the commute on the bus for example. Changes in the physical environment due to this practice manifest themselves in many ways. We know interviewee #30 appreciates being able to work in his home garden with his tablet, but what are exactly the changes this effects on the physical environment isn’t entirely clear. This is missing and it can only be assumed that some extra furnishings may have been added to the garden to make reading on a tablet more comfortable. However, there are instances much more clearly visible, with interviewee #31, pointing out the installation of charging points in some areas of the school where people could meet and recharge the batteries on their devices. This is similar to the installation of USB jacks on bus shelters in Paris or Wi-Fi being available on some inter-city buses in England. As interviewee #39 points out poignantly, Wi-Fi is not available on the train between Cambridge and London, and this is considered a significant inconvenience for him.

All academics clearly like to have their work at-hand at all times, with the only exception being when on break or with family (interviewees #32 and #36 for instance). This is physically made possible by smartphones and the Cloud (even between workstations at home and office) or a Virtual Private Network (VPN) for specific cases (interviewees #26 and #32). Even though the smartphone isn't suitable for all types of work, it is seen as possible. Sometimes, however, having everything at-hand is not desired. Some see the Internet as a potential distraction and prefer to not have it at-hand for specific tasks. Interviewee #36 is an excellent example in that he often looks for a café – with no Internet connectivity available – to work in when faced with a deadline for an article review. This is similar to a tactic used by interviewee #21 at McGill. On the other hand, for others like interviewee #39, not being able to connect on the train is a big inconvenience and generates a certain amount of frustration.

Again, as we saw at McGill, distraction from ICT is a concern and academics take various measures to avoid it or control it. For example, interviewee #45 uses noise-cancelling headphones to keep conversations from distracting her in the office. Otherwise, ICT changes the physical environment, and distraction is perceived thanks to the possibility of surfing the Internet or getting notified of new emails. In response, academics change the settings of their email or change work settings completely by going to a café without Internet for example (as is the case for interviewee #36). Both interviewee #37 and #47 turn off email or Internet entirely on their devices when writing. Interviewee #32 likes to completely disconnect when feeling tired by going to a garden nearby the school without any devices.

Being connected with devices, at least in the office, seems to be important if we are to judge at how close smartphones are located to the academics' workstations. They seem to be always at-hand and available for calls, or any other notification. In interviewee #36's case, it is propped up against the workstation computer itself so that the screen is more visible when working at the keyboard (see Figure 29).

As far as collaborative platforms, such as Dropbox or Google Drive, are concerned, the experience is quite mixed. The perception of the affordance on offer is very uneven. Some don't use it at all either because it's too complicated or not effective. Most others

use it in a limited way as a repository. Only one seems to cite use of such platforms for working on a single document by multiple authors. It was under very specific circumstances where the co-authors were co-located and working as part of a consultancy project, not producing academic work. In terms of practices, collaborative platforms such as Dropbox and Google Drive haven't significantly altered how academics work together as co-authors. The Cloud has changed the physical environment by making the same files available to many individuals simultaneously. However, beyond this, most academics continue to collaborate on writing articles in a sequential manner and coordinate using email. Academics see the use of the Cloud as a repository for either personal use – allowing a certain seamless access across devices – or for sharing with colleagues and collaborators.

We therefore see the return of the affordance paradox that we observed at McGill, but with a twist. Why do some like the convenience of not carrying paper (interviewee #25) and others will happily carry paper (interviewees #41 and #42)? Why do academics feel “wedded to their desks” for data analysis (interviewees #44, #26, #32)? Why does interviewee #33 prefer working on important documents on-screen rather than with paper like most other colleagues at JBS? Why does interviewee #48 see a document on-screen and anticipate a certain affordance which doesn't exist? We don't seem to really learn anything new about affordances, the causal link between it and ICT and why they produce such different outcomes for different individuals.

The problem lies with the concept of affordance itself. We find that there is a discontinuity between the instantiation of an affordance – essentially making it physically possible, and its perception. Applying a Gibsonian perspective, we would expect the perception of a specific affordance to converge with the same outcomes across individuals. However, this is not the case, and we observe two issues in the analysis. First, there seems to be no systematic pattern for the perception of affordances. To put it plainly, given the same practice in similar physical environments, an instantiated affordance may or may not be perceived. Furthermore, when it is perceived, it seems to either be the result of chance, training or the observation of others. There are no observable instances of an academic perceiving an affordance outside of these circumstances. Second, when the affordance is eventually perceived, it almost always



produces outcomes which are diametrically opposed. Gibsonian affordance cannot explain why a handful of interviewees prefer to read and annotate journal articles dealing with complex ideas on-screen as opposed to the clear majority of their colleagues who prefer paper for this task. Likewise, it cannot explain why some prefer to do creative work on-screen while others prefer paper, knowing what is possible on-screen.

This presents a problem for the triadic causal model, specifically its use of affordance. Gibsonian affordance isn't forthcoming from the data. What we end up with is more a conception of possibilities for certain practices. ICT, when combined with the physical environment and the bodies of academics, produce possibilities which may or not be perceived, and which may or may not be acted upon. From the evidence, we don't find academics at JBS engaging with technology, perceiving affordances and then acting upon them. What we find are academics engaging with technology with certain expectations, based on previous experience, and facing either disappointment or success depending on factors which cannot be grasped with a model based on affordance.

Another problem is the organizational space of JBS academics is difficult to define from the data. Although many of the interviewees would try to enforce a clear separation between their work and family or personal lives, all would, in one way or another, involve their homes as part of their workaday. The separation would often be managed by setting aside some time when the family is asleep or away. Beyond the home, work is omnipresent through mobile devices. Therefore, defining an organizational space for JBS doesn't make much sense. This is related to the nature of the profession, and many of the interviewees at both case sites cited the freedom to work from any location as a desirable aspect of their work. What emerges from the data is a picture of academics constantly engaged in a process of organizing in time and space. Although free to work from almost anywhere in theory, most associate very specific spaces with specific practices. We have seen, for example, how for a given individual, reading is strongly associated with specific places, depending on the type of reading. A book will be read in the common room of the JBS by one academic, whereas another one would prefer their home. Although each may have different preferences, space is an important factor in defining which practices happen where.

#### 4.2.2.2.2 Non-ICT

An analysis of the non-ICT instances supporting the triadic causal model leads to the same problems as the ICT instances regarding the notion of affordance. Why do some academics enjoy the atmosphere of a noisy café or the common room to get absorbed in material requiring concentration, whereas others prefer the office or home? Why do some academics eschew the library, while others find conditions there ideal for work? The outcomes for specific physical locations for a specific task are just as variable as for the ICT outcomes. The same limitations apply, and these instances, whether dealing with individual or collaborative work, don't contribute to a clearer understanding of affordance as part of the triadic causal model.

#### 4.2.2.2.3 New Categories

The four new categories generated for the JBS tell us much about the case and we will see how this helps in comparing it with the case of McGill. The references from JBS for the categories Business school context, Faculty Struggle for Space, and Sensuality certainly do resonate with what interviewees at McGill expressed regarding their working conditions. However, the categories of Food and Changing landscape of BS (Business Schools) have a peculiar significance for the JBS since they seem to be more reflective of both the very locally engrained practice of the common table and a certain frustration felt by some academics about the organizational changes taking place in business schools and the effect this has on their work. These differences between the two case sites will be looked at in more detail in the cross-case analysis.

The categories of Business school context, Faculty Struggle for Space, and Changing landscape of BS (Business Schools) are reflective of broader changes underway in higher education in North America and Europe. Interviewee #33 feels the University of Cambridge sees the mission for a business school, such as JBS, in very narrow terms, which puts activities generating revenue above other activities such as research. This, according to the interviewee, means resources and investment are channelled to growth of higher revenue activities such as executive education. This has implications for space, and space dedicated to research activities and researchers themselves is under pressure. Evidence of this pressure is present in the common areas of the building, and especially in the café area within the Common Room of the JBS. Both the café manager and a server

working with him have mentioned that academics used to spend more time at the café and the Common Room before the explosive growth of MBA and Executive student numbers. Regular observations over the course of fieldwork at the site confirm the café area is often saturated by students during breaks making the Common Room a very noisy area. One interviewee compared the atmosphere of the Common Room to that of a gym at times. To further add to the noise, the school rents out part of the Common Room for external events, such as seminars organized by publishers or pharmaceutical giants. In this sort of atmosphere, academics seem to get pushed out and spend less time in the area to socialize. Interviewee #24 complains of the increasingly transactional nature of the culture at the school and the fact that colleagues have less time to interact and be present on-site. This is compounded by the increasing cost of housing in central Cambridge and the increasing time spent by faculty in commuting. Although these last two issues mentioned by interviewee #24 are not necessarily echoed in the interviews with the academics at McGill, they are recognized as affecting contemporary higher education as a whole in many countries. The evidence at JBS supports the view that many of these trends are adversely affecting the experience of academics.

The new categories for JBS are both a reflection of the specific case of JBS but also of some more shared traits. Both McGill and JBS are about to embark on site expansion, but McGill has just come out of a renovation project directly impacting academics, therefore perhaps explaining the fact that the perception regarding lack of space is different. The high growth rate of MBA and Executive students at JBS puts a premium on space and that is combined with the relatively higher cost of real estate in the Centre of Cambridge when compared to McGill.

Lunch breaks seem to be very important for academics at the JBS. This could be due to the tradition of the common table at Cambridge University. The site expansion project raises hopes amongst interviewees of on-site dining facilities which could emulate the role of the college dining halls in getting researchers together to eat, socialize and exchange ideas. At the JBS, there is a strong association between the lunch meal and research collaboration. The emergence of this category and the number of references suggest it could be the basis of an interesting study of the role of food in research collaboration.

### 4.3 Cross-case Analysis

As we have seen in the Research Design section, the cross-case analysis helps deepen our understanding of our object of study, but also enhance generalizability. We will now look at how both the McGill and JBS cases can be compared in terms of the data and analysis. Due to each of their peculiarities, many differences have been observed. However, as we will see, there are strong parallels between the two cases, and this can be helpful in developing our analysis further.

Using NVivo, the case comparison diagram in Figure 48 was generated. Unfortunately, this diagram is too dense to make the detail visible on a single page. I have inserted it here to give an idea of the density itself, and the extent to which both cases share codes. The JBS case is on the left, and the McGill case on the right. We can observe that there are many codes in common – they share a total of 37 codes. It should be noted that although the key categories of the triadic causal model are not shared as far as the coding is concerned, they are indeed shared conceptually. These key categories emerged from the McGill case, and so they are implicitly shared. They are already subsumed in the former categories under Affordance Paradox, Organisation of space, etc.

Each of the shared codes were analyzed with NVivo using query tools to compare the instances originating from each case for a single category. I will not exhaustively list all of the shared codes here, nor the details of the queries performed. However, I will present those results of the cross-case analysis most pertinent to both deepening our understanding and the generalizability of the findings.

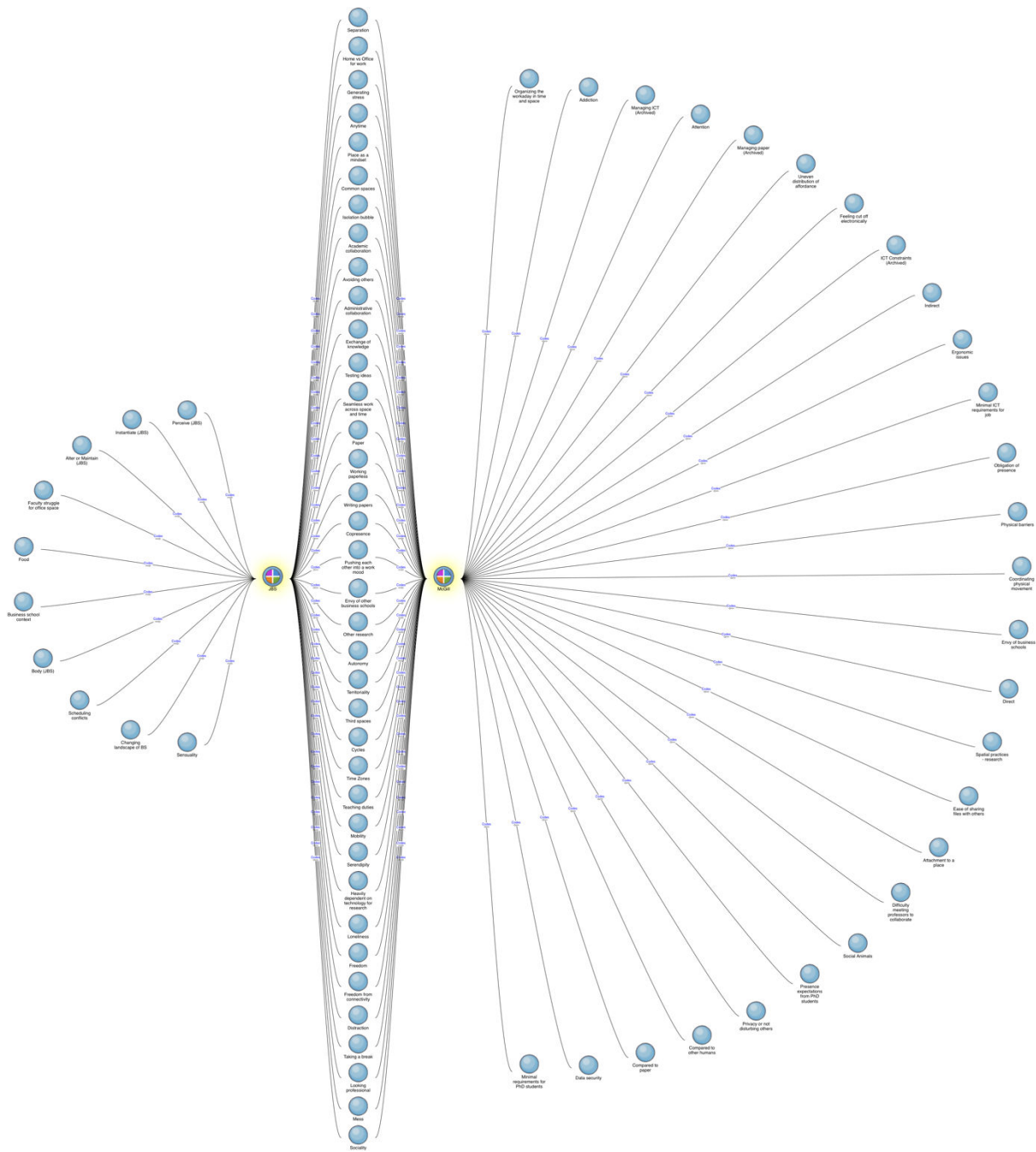


Figure 48 – Case comparison diagram generated with NVivo (Author)

Some of the strongest points in common between the two sites are use of the Cloud for individual professional use, the preference of paper and use of high capacity printers at the office, and having smartphones or other devices close at-hand (on their desks and visible). These practices generated a significant number of instances for both cases. This suggests that the findings associated with these practices are generalizable and provide the basis for hypotheses generation.

Other common practices were going to work in coffee shops, disconnecting from the Internet when wanting to concentrate, and reading emails on the commute to and from work. For this last practice, the fact that the commute for JBS interviewees was perceived as more than a hassle when compared to McGill interviewees does not seem to affect the perception of this time as being more or less useful for working. Interviewees from both sites would see any time travelling – whether it be on a flight or bus – to be a gap to fill with productive work. Interviewees on both sites seemed to feel that any time spent in transit between places, is time otherwise wasted without their mobile devices. However, they would also express the desire to disconnect from devices at a time of their choosing. This suggests that interviewees feel that the commute to and from work is an experience they were not in control of, and that they preferred to choose their café without Internet or garden square for some fresh air when they wanted. The paradox is that in both cases there is an element of escape. The commuters seem to feel trapped on the bus, and hence look for ways of modifying their experience by either reading emails or journal articles. The contrary happens for those who seek to disconnect completely to return to the immediate surroundings with a garden or a printed journal paper. Indeed, the pressures of business school life mean that academics feel they need to try to find opportunities for increasing their productivity. Nonetheless, it seems mobile connected devices, and those experiences that are associated with them, are perceived differently depending on the practice.

At both sites, when asked about academic collaboration, interviewees recognize the limitations of technology for building new relationships. They cite all of their collaborative projects, past and current, to make the point that they had never developed a collaborative relationship online. Most of those at the JBS would have developed collaborative relationships at their previous institutions and carried them over. Collaboration using the Cloud or Skype, for example, were seen as very useful for collaborating with these established relationships. Although not necessarily surprising, trust remains an issue with ICT mediated interactions. This is clear in the data collected from both sites. One interviewee at the JBS was keen to point out that he sometimes appreciates the fact that when on a Skype call, the collaborator cannot see whether he is paying attention to the screen or not. Despite the established trustworthiness, the academic is aware that his collaborator's perception of space, of his body, are somewhat

impaired by the medium. Collaborative practices seem to benefit in a wholly unexpected way from ICT.

Expressions of frustration regarding procrastination or admissions of addiction to devices and the Internet were less explicit at the JBS when compared to McGill. McGill interviewees seem to be more forthcoming in terms of their experience – especially the negative ones. At McGill, interviewees would employ terms such as ‘hate’, ‘addiction’ or ‘pissed off’, when describing their frustrations with ICT. The mood at the JBS was significantly soberer and subdued than at McGill. This could be due to cultural or institutional differences. As a native from Montreal, I recognize the tendency to be more forthright in expressing a feeling when asked. Also, having lived in the UK for 6 years, I have first-hand experience with the proverbial ‘stiff upper lip’ of the Englishman. However, this is unlikely given the mix of nationalities of the interviewees on both sites. It is difficult to pinpoint the reasons for these divergences with the data collected for this study, however it would be interesting to conduct a survey with academics at both sites to understand their attitudes towards their devices, and more specifically their smartphones. As I have mentioned already, one of the most common sights at both sites is a smartphone at hands-reach next to the workstations of interviewees. Emotions linked to devices seem to have important implications for the experience of space and should be investigated further.

When looking across both sites, there is very little variation in occurrences with regard to age or seniority. Two of the eldest interviewees – one at the JBS and the other at McGill – were both the most attached to the practice of reading and annotating on paper. Apart from this, there was very little apparent correlation between these two demographic attributes and how ICT would be perceived as part of interviewees practices. This was even the case with the youngest of the PhD students. This is an unexpected result, given the popular idea that younger generations are more inclined to be comfortable working on-screen. This reinforces the generalizability of the findings associated with the practice of reading and annotating on paper. It also provides yet another dimension to investigate in a future study.

The fact that the category Food emerged at the JBS and not at McGill can be mainly attributed to the history of Cambridge University, and more specifically its colleges. This tradition of the common table is very peculiar to Oxford and Cambridge, and cannot be taken to affect the findings for this study. On the other hand, they could be interesting for another study focused on the practice of eating and how ICT affects experience.



#### 4.4 Discussion

In this section, I will discuss the findings of the multiple-case study of the spatial practices of academics at McGill and the JBS. First, I will reflect on why it is important to look beyond the visible when considering space in organizations, especially as it relates to ICT.

The daily work practices of academics at McGill and JBS and their associated joys and frustrations when using technology, should be familiar to most office workers. The juggling of various tasks, both personal and professional, during the course of the day is a challenge requiring some structure. Coordinating resources, whether it is at the individual-level, or at the collective level, means organizing across space and time. This organization is achieved through practices programmed in time and space. Practices, particularly those in university settings, have traditionally been strongly anchored in well-defined spaces and times. The university campus and teaching cycles, dividing the calendar year into academic semesters, have been around for centuries. Although academic research activity doesn't follow a strict calendar, it is rhythmized by the academic cycles and the broader life of the university campus. Technological innovation, such as the printing press, have underpinned changes in practices for academics by changing the physical environment.

As Apollinaire reminds us, script, whether manuscript or printed, are symbols and representations in physical space (2013). The production of script is a spatial practice, as is reading. Script has a direction – it can be vertical or horizontal, up or down, and, right to left or left to right. Script can have different shapes and sizes, as well as colors and styles. Braille is the script that perhaps best allows one to appreciate script's spatial nature by having a texture occupying all 3 dimensions and stimulating the sense of touch of the blind, and that of sight (and touch) of others. Script can be etched in rock, such as stone tablets, or drawn in ephemeral smoke in the sky. Although ICT refers to the most recent silicon-based advances, technology has long been used to store and transmit information in the form of script. ICT, however, uniquely allows us to spatially construct and reconstruct information, in the form of script and images, dynamically in

space and ubiquitously with pixels on screens. Office printing being a less dynamic version.

Given the centrality of script for academics as both a repository and means of transmission of knowledge, innovations in ICT will have myriad consequences for their practices. One of these will be in how these innovations change the physical environment of academics and others around them. Setting aside all knowledge to build and operate it, ICT is entirely composed of matter and energy. In this sense, it is part of the physical environment like trees, buildings and human bodies. This can be considered an evident observation. Cables run through our cities and buildings like networks of veins and when we work on a computer we are in contact with a solid object radiating energy in the form of heat and light. The installation and expansion of this infrastructure has consequences on the physical environment. For example, cables need to be laid, dry risers built, energy generated and transported to computers, energy generated and transported to cool the computers, buildings and rooms constructed to house the computers, towers built for antennas (the Eiffel tower being the most famous), factories built to manufacture devices, recycling facilities built to process waste, and logistical platforms to ensure the transport of coal and new monitors. These consequences are visible in the field in business schools as the following passage from interviewee #31 at the JBS attests:

Well, to a large extent your... I mean, space is a constraint, you have what you have and what you need to do is you need to adapt it. So e.g. if you go out into some of the corridors you'll see that for a long time we've had these kind of, meeting spaces on the balconies. When I first came here in 1994 they were just spaces and they'd have a round table in them and some chairs and they'd be places for informal meetings. But over the years what we've had to do is adapt them. We've had to put power sockets in, we've had to add, you know, the, you know, Category 5 cables. We've had to then make sure there's good wireless connectivity in all of these kind of, different nooks and crannies. We then, just recently over the Easter vacation, put in swingout whiteboards and so on. So they have become progressively much more important meeting spaces, collaborative meeting spaces.

The evidence of the transformation at the JBS described by interviewee #31 is visible in Figures 49 and 50.



Figure 49 – Bay area with table on 5th floor of the JBS (Author)



Figure 50 – Charging pod in bay area of 5th floor of the JBS (Author)

These are the same considerations at McGill, as the following extract from an interview with the facilities manager at the Desautels Faculty of Management attests:

Okay, we could go up to the ... Ummm ((looking at the floor plans and hesitating)). Anyway, yeah, so all of these rooms, this one no, and these ones only kinda half because we didn't actually redo these rooms. This one for sure. This one does not, but it has a whole lot of them around the edges. So the thing is that in a room like this room has tables that move because we have two different types of classroom basically, we have rooms where the tables can be re-arranged and then we have rooms where they're fixed. Obviously the tables can be arranged so you can't have a laptop plug coming out of it, so. These rooms, this one's all around the walls, and those rooms and this room ((pointing to the floor plans)). Yeah, take your pick. They all have them ( ), it's basically for every two seats, there would be one or two plugs.

When starting out with the exploration of the relationship between ICT and organizational space, this was the most obvious and visible dimension of the relationship. When discussing the topic with peers, the idea of the arrival of the era of work anytime and anywhere would be quick to surface. When challenged with material evidence of this new trend, many would often point to power sockets or Wi-Fi hotspots. However, beyond this, lays a more elusive yet intimate relationship between ICT and organizational space. This relationship would reveal itself to be centered on the body.

Based on the analysis of the findings of the McGill case, a triadic causal model was developed (see Figure 51) centered on the body. The phenomenological sensitivity retained from the beginning, with Lefebvre's theory of the production of space, resulted in the body emerging from the McGill data as being central to the relationship between the physical environment (including ICT), affordance and practices. It was the body which would animate the triad by instantiating affordances, perceiving them, and then either maintaining or altering the physical environment as part of a practice. The triadic model was then used as the basis for the coding of the JBS case.

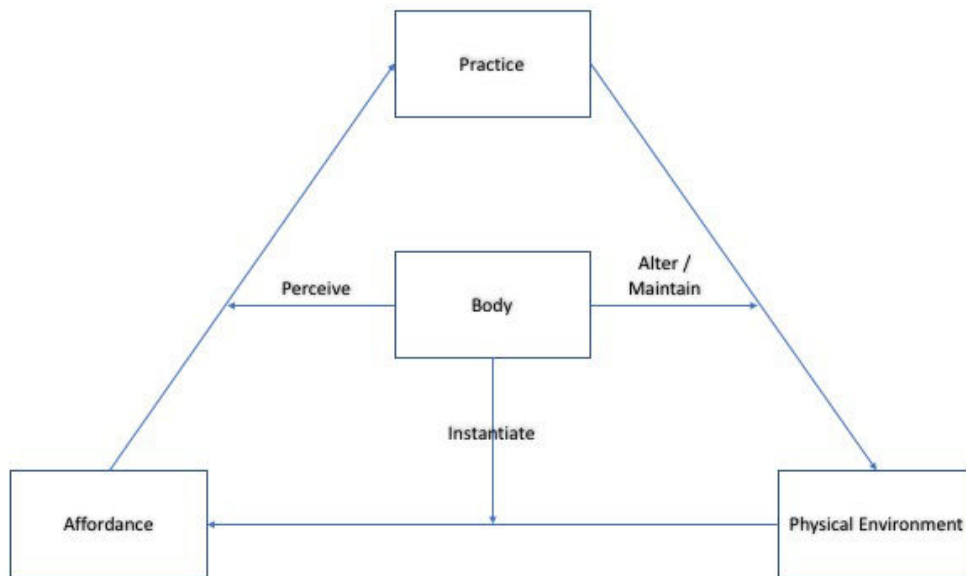


Figure 51 - Triadic causal model (Author)

However, confronting this model with the data from the JBS would reveal a serious shortcoming. The analysis would reveal that affordance was incapable of explaining the variation in perceptions of affordances for a given practice and physical environment. The findings confirm several aspects regarding the concept of affordance as it can be applied to an understanding of the relationship between ICT and organizational space. It is a notion which has been extracted from its original context in Ecological Psychology to be applied to domains for which it was never intended. Hence, it is inappropriate for the study of ICT. As expressed by Kallinikos (2003) and Oliver (2005), ICT by its nature, divorces form from function and makes the notion of Gibsonian affordance difficult to apply. The findings provide two notable instances:

Interviewees #26 and #33 both suffer from eye-strain from reading on-screen, however only interviewee #33 has found a solution using the zooming features offered by software, whereas interviewee #26 would feel 'stuck' and revert to printing documents even though he would prefer to continue on-screen.

If we go back to Gibson's conception of affordance, and more specifically the visual perception of an individual in the environment, we quickly see how this doesn't work with the above examples. Regarding eye strain, only one academic could find a solution for his problem - allowing him to continue reading on-screen - with the available

possibilities of ICT, whereas the other continued to struggle and often reverted to paper as a solution. On-screen magnification of text is a basic feature of word-processing software or operating systems. However, as Gibson would see affordance, it isn't visibly perceived by interviewee #26 as part of a regular interaction with devices in his environment. Interviewee #33 didn't either perceive this possibility from his device – it was discovered either by chance (a random movement of the fingers across a tablet screen for example), or by simply reading the instructions or following a tutorial. One could argue these academics eventually perceived 'visible' solutions to their problems – paper in one case and on-screen magnification in the other. However, even these 'visible' possibilities require prior knowledge and therefore their 'visibility' will entirely depend on the previous experiences of the individuals. In all cases, Gibsonian affordance is therefore limited to the instantiation of the affordance when the bodies of these academics interact with the physical environment. This instantiation only makes magnification possible, but not necessarily perceivable, at least not in the Gibsonian sense.

Although this may seem self-evident – after all, one needs some training or trial-and-error to effectively use ICT in various environments – in IS literature, there is often a jump from functional properties of ICT (in isolation) to users readily perceiving these properties when interacting with devices. With this view, affordances are just a catalogue of passive features waiting to be perceived by the user when interacting with a device. However, the process of learning about how a graphical user interface works is frequently ignored. The human brain evolved to cope with the challenges of survival in the savannas, and has not had the opportunity to evolve to cope with our modern surroundings. In the film "The Gods Must be Crazy" (Uys, 1980), the life of the bushmen of the Kalahari Desert are – admittedly naively – contrasted with South African urban civilization in their needs for survival in their respective worlds. The 'civilized' with their sprawling cities and technologies are dependent on educating their children for many years to survive. The bushmen children, on the other hand, learn from their elders in observing their daily activities. In both cases, education and experience are essential. We get hold of a smartphone and just start pressing various buttons or icons on the touch-screen. We explore the various menus and try different features to see what happens. Of course, we will need to look at the help menu to understand how to

configure an email account. But getting there not only required some fiddling around, but knowledge only possible from years of education and experience. With this knowledge, I gain experience with the device and slowly the movements are at the tip of my fingers. This is how I am able to type these words with a keyboard without looking at either the keyboard or my fingers. Through education and experience over time, by typing repeatedly, I no longer need to stop and consider what happens between my fingers and the keys when my hands hover over the keyboard. This is why Gibsonian affordance is such a problematic concept for the study of ICT in organizations. The key of a keyboard may perhaps call forth for the act of pressing on it. But for what purpose? If we are to consider affordance in the truly Gibsonian sense for a keyboard, then we would have to ask ourselves what the bushmen of the Kalahari Desert would have done with one encountered in the savannah. Use it as a shovel? As a weapon? The Coca-Cola bottle found by the main character in the film was seen as being useful as a hammer and a musical instrument amongst other uses, but never as a recipient for liquid. Likewise, nothing about a keyboard would call out for typing on its own without one ever having previously seen one or experienced first-hand the effect of pushing on a key on what is displayed on a screen. On a manual typewriter, the pressing action of a key will immediately cause the typebar to strike the platen. If a sheet of paper and a ribbon are present, a character would appear as ink on paper. Even in this case, one would have to try before realizing this. Would a bushman press a key to swat a fly on the platen when first encountering a typewriter? To claim a device such as a tablet computer with a tactile screen calls forth for a swiping motion without any prior experience of manipulation is nonsense. A tablet computer is otherwise just a slab of solid matter. Perhaps until one starts to manipulate it and possibly eventually stumble upon the swiping of a screen. Nothing about the structure of the light reflected off a tablet computer – or any other ICT artefact for that matter – and reaching the retina of a perceiver contains the information regarding the possibilities for action the tablet computer offers apart from as a slab of solid matter (perhaps as a mirror?). This is the critical test for Gibsonian affordance, and the evidence from this study shows that it systematically fails for ICT. Designers of devices have tried to fool the human eye by mimicking the texture of objects on the screen, but have never been truly successful. This is one of the challenges virtual reality has taken up, and it will be interesting to see how successful designers are. A deep understanding of visual perception would be

required, and for this, the puzzle of the human brain needs to be solved first. ICT devices today, apart from being inanimate objects, do not call forth action on their own from individuals as its designers intend. When designers claim to have developed an 'intuitive' graphical user interface, what they have in fact achieved is a design exploiting existing knowledge and requiring the least amount of training. For example, the graphical user interface of the Apple Mac OS is recognized as being easier to learn and use than that of the Microsoft Windows OS. This is not due to any difference in affordance between the two designs, but rather the clever mimicking of well-worn gestures for manipulating objects in daily life. For example, in Mac OS, one normally needs only to drag and drop a new program file into the Application folder as opposed to performing a multi-step installation process with many technical configuration parameters to set in Windows. With Mac OS, installing a new program is just like dropping a brand-new tool into a toolbox full of other tools. Whether it's Mac OS or Windows, using either first requires some prior engagement with artefacts or a certain degree of training. Neither is intuitive, at least not in the sense of Gibsonian affordance, since both require some form of prior knowledge either through socialization or experience.

As we have seen in the section dealing with theory, the manner in which the IS literature has appropriated Gibson's notion of affordance is only a more convoluted version of popular belief about the possibilities ICT offers individuals. However, a smartphone with mobile Internet does not 'afford' work anywhere anytime. It certainly makes it physically possible, however. The infrastructure and devices allowing one to access information stored at a distant location change the physical environment to make certain practices possible in multiple locales. However, this is not affordance. It is only the instantiation of a possibility offered by the body in the physical environment, of which ICT is just a part. We observe from the academics at both McGill and JBS the practice of 'doing emails' on the commute between the home and the office on smartphones. The smartphone makes this possible, but it also makes possible many other practices such as reading journal articles or writing a paper. Although some do read journal articles on smartphones on longer journeys, or at other times and places, most prefer to just read emails. Why is this so? There is strong evidence the academics feel constrained by the ergonomics of a smartphone for reading and typing. Generally,



they prefer to perform these tasks on a larger device and keyboard and often wait to be seated in front of their workstation or laptop in the office to reply to emails. To reiterate, this is not a question of affordance either. The workstation in the office does not call forth a certain action by the academic by virtue of its essential visible properties more than the smartphone on the bus. They both make the reading or writing of emails, for example, possible. But one is more comfortable than the other. More insightful, is the observation that academics feel the environment of the bus of the morning commute as being more amenable for certain practices when compared to other times and spaces. In all instances of this practice of 'doing emails' on the bus, academics would cite this time period as being otherwise wasted and that they felt they could be more productive by engaging in a practice not requiring too much concentration. The physical environment of a bus, for example, is usually constrained, noisy, jittery and generally full of distractions (people getting on and off, changing seats, etc.). However, these are relatively diffuse distractions only requiring a peripheral attention as opposed to that required at home when one has children to care for. There are also fewer things to do on the bus when compared to the home. On the bus, the dirty dishes are not waiting in the sink to be washed. On the other hand, the bus, as a matter of experience, doesn't provide the type of environment for the concentration required for reading text expounding complex ideas or dense writing. The bus does provide the type of environment for reading emails – especially the short ones requiring short replies – on a smartphone for relatively brief periods of time. This is also seen by academics as a way of maximizing the use of the tranquillity of the office for practices requiring much more intense levels of concentration.

Although smartphones on a bus are not like Gibson's natural environment, we internalize the virtual structures that collapse and redeploy the spatial landscape in a dynamic way. Users of a smartphone internalize the 'contactability' of close friends and family such that they would have the reflex of reaching for the device almost by habit and without hesitation when the desire to speak to a friend emerges. This happens without reflection or thought as interviewee #8 makes clear in the following passage:

If it was here in the library, if there was a kiosk somewhere in the library or I mean similar to this floor where I could go to that area, watch the lectures, take notes or watch the lectures, do my online report, which is like one of the grading parts of that class, then that would be fine with me. I wouldn't mind. I would

almost be happy about that because then there's no distractions that I have on my laptop. There's no command TF enter and I'm on Facebook again. It's just like, oh my gosh how did this happen.

Coming back to Kallinikos' rupture between form and function of ICT in terms of affordance, if we introduce the notion of habitus, we immediately see how this bridges the conceptual gap between the instantiation of possibilities and their perception in the triadic causal model. Like the above verbatim suggests, a certain habitus or internalization is responsible for the reflex of going to Facebook with a quick combination of keys. Some apparent 'affordances' of ICT are in fact possible with habitus. For example, the laptop which is not 3G enabled, but works on Wi-Fi within the confines of the office – I will internalize the fact that I will not be able to connect outside the office and don't expect connectivity when outside the office. The 'affordance' is prior to the habitus – prior to my learning that Internet is not accessible by trial and error. Affordance is in fact no more than just another expression for possibilities for action. The findings show that it is incapable of explaining perception in the case of ICT.

Although the notion of affordance is problematic for the study of modern organizational practices, we can still address the main problem Gibson sought to solve by taking a phenomenological approach – the object-subject dualism. According to a phenomenological approach, there is no difference between outside and inside as a matter of experience. What we see through visual perception is being 'seen' in the same place as where thought occurs. When our bodies move through space, our sensory perception of space is complemented by thoughts. A closed door is a good example. We expect there to be a space behind the door and that it swivels to one side when we push it. None of this is perceived through sensory input, but our bodies are primed for an invisible space. We are not halted by the door with wonder about whether a room is on the other side. Our stride is never truly broken – we combine the pushing of the door with our walking motion, adjusting somewhat for the delay and effort required to push. The room on the other side of the door is 'seen' by our body and it assumes it as being there as part of the environment. Of course, there is nothing natural about a door. We only know from experience that a room lies on the other side of a door. A bushman who would first walk into a long hallway full of closed doors would likely see just a long tunnel with regularly interspaced shallow recesses in the walls. For us 'civilized'

individuals, we are often disturbed when we come across a door that has been walled-off. The expectation of a room behind it is ingrained in our minds and our bodies yearn to open the door to discover an unknown locale. For example, after having visited the chateau of Maisons-Laffitte recently, I found my imagination running wild with speculation about the secret passages behind the doors hidden in one of the walls of the *Appartement du Roi*.

With a phenomenological approach following the work of Merleau-Ponty (1976), Gibson's conception of affordance can be re-interpreted as the horizon of available possibilities from the knowledge accumulated by the body from prior experience. The quality of this horizon is determined by the intentional arc projected by the body. Loosely translating Merleau-Ponty, we aim at a world and perceive it (1976). Who hasn't ever had the experience of reaching over to one side of the desk to get mug of coffee or smartphone to only realize it's not there. It is at these moments we appreciate how a certain awareness of space is present in our minds at all times. It is a form of perception without seeing. We 'see' the coffee mug or smartphone there without actually seeing it using our sense of sight. Although we don't actually see it with our eyes, we have **seen** it there before, perhaps several times since it is a habit, and therefore it remains etched in our spatial awareness. Much like the amputees in Merleau-Ponty studies, where subjects 'see' and 'feel' their missing limbs in space (1976: 92-96). The availability of the grasping of the coffee cup or smartphone is part of what Merleau-Ponty calls the body schema. The body schema is a pre-conscious awareness of available bodily movements and spatial relationships. At a given time, the body schema will be determined by the intentional arc, or what the body projects as encounters with the world. This intentional arc is projected by a certain posture we take with our bodies vis-à-vis the world. When sitting at our desks focused on reading a paper on the screen of our laptop, our body projects the 'grasping' of the text displayed on the screen and the grabbing of the coffee mug or smartphone into space. The intentional arc is what allows one to grasp the world and orients the body schema for this purpose.

The phenomenological concepts drawn from the work of Merleau-Ponty above are therefore more suitable for the development of an understanding of the relationship between ICT and organizational space than affordance. Several key concepts need to be

clarified, along with their relationship to each other, before Merleau-Ponty's ideas can be used to better understand the findings of this study.

As mentioned earlier, the body schema is an awareness of what is possible for the body in space. It is guided by the intentionality arc, or a projection of encounters with the world. Husserl refers to the *fungierende Intentionalität*, or operational intentionality, as that which unites our being and the world in a natural and antepredicative manner. It is generated by a certain mindset – or mental atmosphere – and becomes apparent in the expression of the body schema as the body engages with the world. The context of this engagement will be oriented by the task the body is engaged in, as this will discriminate certain areas of contact with the world from others.

*En dernière analyse, si mon corps peut être une « forme » et s'il peut y avoir devant lui des figures privilégiées sur des fonds indifférents, c'est en tant qu'il est polarisé par ses tâches, qu'il existe vers elles, qu'il se ramasse sur lui-même pour atteindre son but, et le « schéma corporel » est finalement une manière d'exprimer que mon corps est au monde (Merleau-Ponty, 1976: 117)*

In a series of empirical studies, researchers have observed how visual perception of human subjects is shaped by the task they engage in. In these experiments, individuals would be shown a video of two teams wearing different color t-shirts passing around a ball in a closed circle. The circle would be composed of alternate color team members and each team would pass a single ball to each other. The teams would therefore be engaged in maneuvers crossing each other's pass. The subjects would be asked to count the number of times one of the teams passed the ball to each other during a 30 second segment. During this segment, a person either with an umbrella or wearing a gorilla suit would walk right through the middle of the circle and disappear from the screen. The results showed that many of the subjects would miss the umbrella-carrying person or the gorilla. The rate would depend on the similarity in color between the unexpected intruder and that of the team the subject was asked to keep track of (Most et al., 2001). Although these findings are limited to visual perception, they show how the general attitude a body takes towards its being in the world will shape what world is perceived. This is what Merleau-Ponty means when he writes that we aim at a world and perceive it. The intentionality arc will shape the world perceived, and it will be done through the body schema. The body schema, in the case of the series of experiments above, is the awareness of what is being observed and how to relate to it in terms of spatial relations.

The subjects are aware of what a team is and that they wear the same color t-shirts, what to expect of their behavior with the ball and what counts as a pass. This is knowledge the body had captured from previous experiences, either from watching players at a basketball game or playing the sport themselves. The body is therefore primed through its body schema to perform the task required of it and for encountering a world.

Once we've seen the gorilla in one of the videos used in the aforementioned experiments, we are sure not to miss it the next time. The second time, our body schema has been adjusted to take into account the previous experience. This is what Merleau-Ponty calls *expériences antérieures* (1976: 27) or *expériences anciennes* (1976: 30). These previous experiences color the body schema with a horizon providing a certain mode for the body to project itself into. The second time, we watch the video expecting the intruder to enter at a certain moment. This expectation puts our body into a peculiar state of readiness and anticipation, but we are not surprised to see the intruder when it enters. Our attitude is different the second time.

According to Merleau-Ponty, when an experience is repeated, and a certain habitus develops, the body undergoes a certain conditioning (1976: 102). Habitus is the repository of renewable action (1976: 171) for the habitual body. The habitual body in turn supports the actual body (1976: 97). Merleau-Ponty had studied amputees to understand how their engagement with the world had changed with the loss of their limbs. He found that, as a matter of experience, it hadn't changed insofar as the amputees would 'grasp' the world as if their limbs were still present. According to his findings, if I were to have my arms amputated for whatever reason, the perception of the 'grabbability' of the coffee mug or smartphone would remain in the habitual body. My experience of the world would be the same as before the loss of limbs. It is only when the lack of a hand – or the missing mug or smartphone – is made conscious that our experience is reframed. Merleau-Ponty refers to the body as grasping and understanding movement. This is how the body grasps the world, and the development of habitus is the grasping of a meaning – a motor grasping of a motor meaning. The habitual body is expressed as part of the body schema and motor movement the original intentionality. I see my smartphone, I can check emails as opposed to I think I can check emails.

Like Gibson's affordance, Merleau-Ponty's phenomenology of perception accepts the idea the body is solicited by things in the world, but the world is that of experience and the body is a knowing body.

*La conscience est l'être à la chose par l'intermédiaire du corps. Un mouvement est appris lorsque le corps l'a compris, c'est-à-dire lorsqu'il l'a incorporé à son « monde », et mouvoir son corps c'est viser à travers lui les choses, c'est le laisser répondre à leur sollicitation qui s'exerce sur lui sans aucune représentation (Merleau-Ponty, 1976: 161)*

The knowing body, following Husserlian antepredicative perception, is a body already in contact with the world before the machinery of judgment kicks in. The body maintains a relationship with the world which produces experience based on experience. It takes for granted, for instance, the space behind the door, the face on the other side of the head, the hand at the end of the arm, or the phonograph in the next room. In day-to-day gestures, there is no questioning these givens for the body. It moves through space knowing these relationships exist. These relationships are expressed as part of the body schema. Merleau-Ponty takes the example of the white cane used by the blind to help them perceive and move through space to demonstrate how instruments can also become part of the body schema. The blind using such a stick consider it, with experience, to be an extension of their body and the length, weight, and other physical properties are completely assimilated by the body into the body schema. In moving through the world with such a stick, the blind will manipulate the stick such that it corresponds to what is solicited as a movement by the environment being felt through the stick. A walk on the pavement will solicit the feeling of the edge, a climbing of the stairs will solicit the feeling of the next step, etc. The body has learned and incorporated into the body schema through experience these relationships with the world and they are available always. Gibsonian theory of visual perception breaks down with the example of the blind at two levels. The first is that it obviously excludes the other senses. The second, is that it ignores the knowing body that retains previous experiences of encounters with the world and recalls them in – but not for – subsequent encounters. But Gibsonian theory of visual perception breaks down even with those who have the privilege of sight, according to Merleau-Ponty. The phonograph playing in the next room, which is audible but not visible, is in fact fully part of the perceived visual field (1976: 321). Even when stopped playing, the body will register it as still being present in the

next room should one ever wish to go put on another record for play. Given the right mindset, or mental atmosphere, the corresponding body schema will have the phonograph 'visible' and accessible for putting a record on.

One may schematize Merleau-Ponty's phenomenology of perception, as is done in Figure 52, by modelling the being-in-the-world of the body. The knowing body projects an arc of intentionality and will grasp the world with the body schema. The body will not only grasp through the body schema that which is physically proximate (text on the screen), but also what is physically remote (the phonograph in the next room). What is grasped is determined by the intentional arc and the body schema projected by the body.

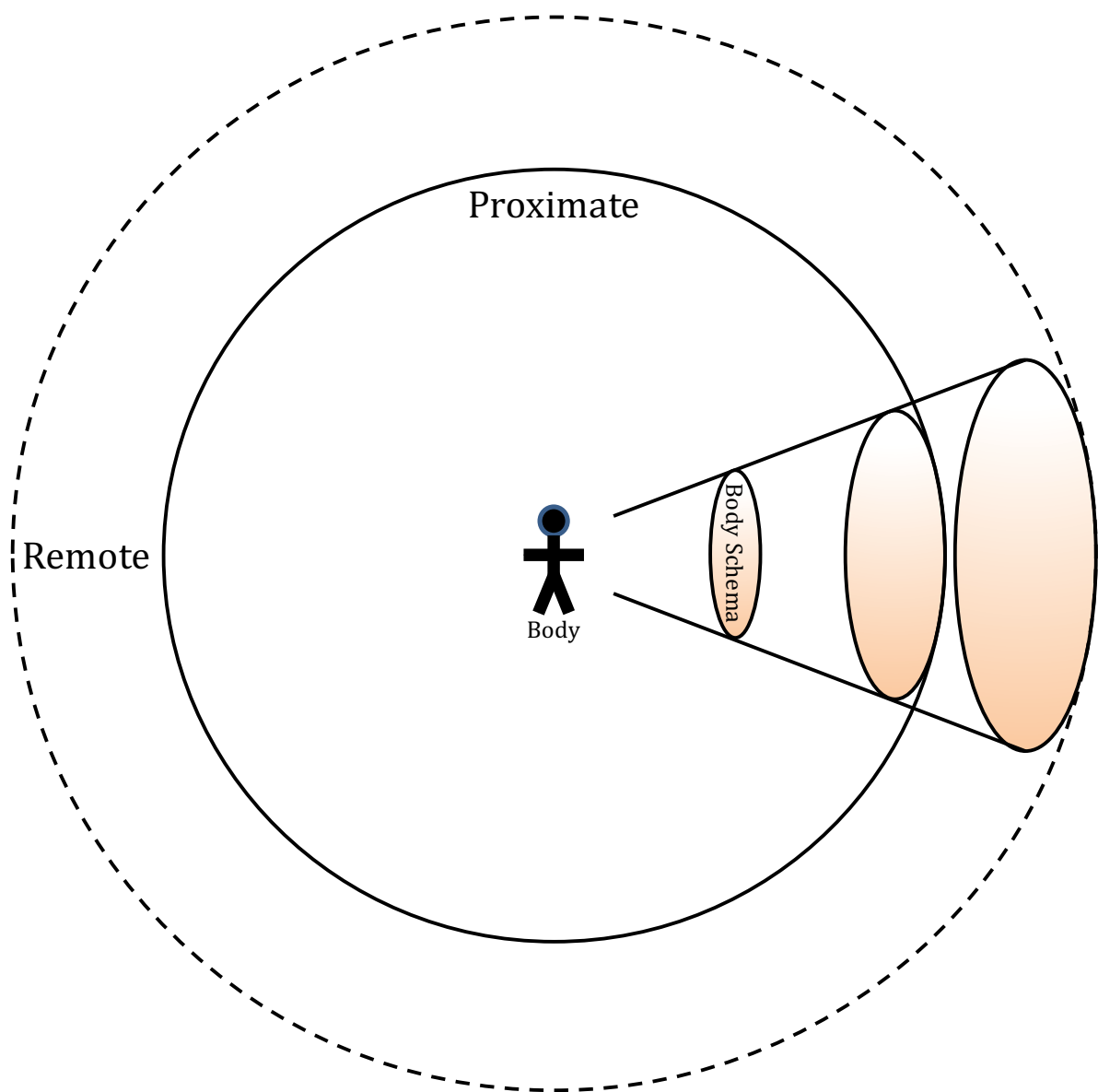


Figure 52 – Merleau-Ponty's (1976) phenomenology of perception (Author)

Despite the layering of the proximate and remote objects, the body will experience all that is perceived through the body schema as being immediately available – or at hand. The arc of intentionality can be thought of as a spotlight and the body schema as an active filter. The arc of intentionality will determine the orientation of the spotlight towards the world, and the body schema what is illuminated, and hence ‘graspable’. The body schema is actively refreshed through experience and will shift with the arc of intentionality. The body schema overlays knowledge from previous experience upon what is illuminated by the arc of intentionality. As far as experience is concerned, there is no definite distinction between proximate and remote objects. For example, they can be both visible or invisible, audible or not. Remote objects are simply further away physically when compared to proximate ones. However, they all belong to the same sphere of experience regardless of physical distance from the body. For the perceiver, the proximate and the remote are superimposed on each other and are equally present as part of experience. Like the room behind the closed door or folded clothes in the closed drawer. They remain ‘graspable’ and are always available.

With this perspective, what is the difference between the mug of coffee and the smartphone on the academic’s desk? Both are immediately present and graspable through the body schema, however there is a fundamental difference with the smartphone due to the manner in which it modifies the physical environment. The smartphone expands the physical environment beyond the immediate surroundings by making available information in the form of text, sounds and images from far away. Of course, this information can also be stored more proximately in the device itself. The smartphone is part of both proximate and remote physical environments. The body knows this and will project a body schema making this information graspable. The smartphone is in fact not just graspable as a proximate artefact, but as a set of possible layered proximate and remote spaces. The smartphone is a door which opens into multiple rooms physically located both proximately and remotely. Just like the room with the phonograph, the body is aware it is there and that it can access it along with all of the objects within it. As a matter of experience, ICT adds a number of additional layers to the physical environment accessible through the body schema. It is as if one had an infinite number of drawers in their desk, all containing different objects. Depending on the arc of intentionality, the body knows the objects they contain are graspable at any



moment. The body knows through the body schema how the drawers are opened and how to make sense of the objects in each drawer.

For example, several academics had their smartphones on their desks next to their workstations. They were not just phenomenologically at hand, but physically so as well. On several occasions, the academic would briefly glance at the device to check for messages or other information regarding an appointment. This is information of a remote nature, in that it is information about events occurring in a remote physical space. However, the graspability of this information is made possible by the ICT comprising of the smartphone itself and all of the infrastructure upon which it depends to be able to function (network, servers, energy distribution, etc.). The information is at hand as if the academic could just open a door at any moment to check whether someone is present or not in the other room. Since the smartphone is portable, these doors are always available to be opened when the academic has the smartphone on his or her person and has a mobile connection. This expectation is assimilated into the body schema and we see this when academics such as interviewee #39 express frustration at not being able to get a mobile connection when on the move. The expectation is part of practices regarding work while travelling or commuting. The academics spending time on the bus have integrated 'doing emails' during the commute. The effect of this practice is to change the experience of the commute. The body of the academic will have a different posture and attitude on the bus and will project a specific arc of intentionality corresponding with 'doing emails' on the smartphone. The body schema is projected onto the physical environment – including both the proximate and the remote. From the resulting experience of the academic, there could be shifts in both intentionality or body schema. Should the bus be particularly quiet on a given day, the experience may encourage the academic to type longer replies than usual and therefore alter his attitude and body schema for this purpose. As long as the smartphone is able to connect to the Internet, the physical environment will always comprise of both the proximate and remote physical environments it makes available and instantiate all of the possibilities this implies. In theory, the commuting academic has access to an infinite set of drawers or rooms containing an infinite volume of information. However, as far as experience is concerned, the commuting academic will only perceive that which both the intentionality arc and the body schema are engaged with in the world.

Although composed of both proximate and remote physical environments, the environment perceived by the academic is as a single sphere of experience. In this sense, distance is irrelevant as far as the experience is concerned. This is the same effect as with documents in a filing cabinet sitting in the next office – it is relatively remote when compared to a document on the academic’s desk, but still graspable as far as perception is concerned. The only difference with ICT, in terms of distance, is the degree of remoteness it makes possible. ICT also makes it possible to store larger volumes of information both proximately and remotely.

This possibility which is unique to ICT, has the potential to negatively alter the experience of an academic, and hence to adversely affect intentionality and body schema. Academics have complained of being distracted by both checking emails too frequently, consulting social media or news websites compulsively and generally surfing the Internet aimlessly. Some have described these tendencies as addictions.

Although phenomenology does not lend itself very well to models such as the triadic causal model based on affordance, we can develop the following model in Figure 53 based on the results of this study and based on the phenomenology of perception of Merleau-Ponty. The perceived world is the world of experience and it is represented by the black oval. This is the same oval as in Figure 52.

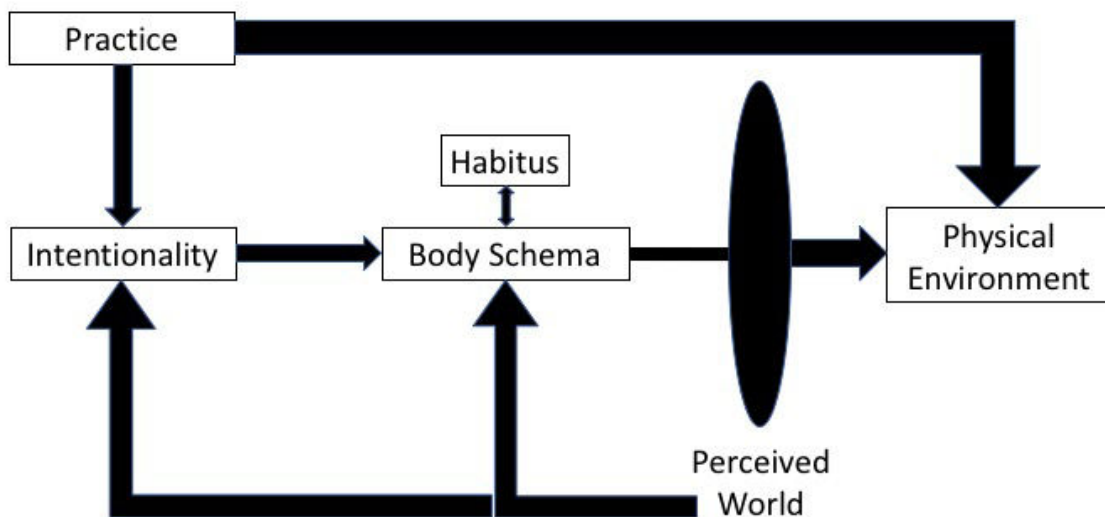


Figure 53 – Alternative model based on Merleau-Ponty (1976) (Author)

We can test this model against some of the data from both cases studied. First, we look at the data from McGill.

As part of the practice of reading (studying for exams), Interviewee #8 (undergraduate in Industrial Relations) used to sit in the library or another location with his smartphone next to him. But the experience was of distraction and frequent interruptions due to his tendency to reach for his smartphone to check for messages. Placing the phone next to him reveals a certain intentionality incompatible with that associated with continuous periods of concentration. This is reflected through the body schema – having the smartphone at-hand – and results in the experience of distraction. The student found that he would be able to better concentrate by placing the device at the bottom of his bag. This action itself would be the result of an intentionality and body schema associated with a desire to improve concentration for this practice. The action would help shift the intentionality and body schema for reading by getting the student to ‘aim’ at a different physical environment without the smartphone at-hand.

As part of the practice of sleeping, interviewee #16 used to leave his phone switched on next to his bed. But the experience was that of disrupted sleep from being preoccupied by unread messages. Like interviewee #8, placing the phone next to his bed reveals a certain intentionality incompatible with that associated with sleeping. This is also

reflected through the body schema – having the smartphone at hand – and results in the experience of insomnia. This academic found that by switching off the device at bedtime, he was able to better sleep. The action of switching off the phone is the result of an intentionality and body schema associated with the desire to sleep better. This in turn would help shift the intentionality and body schema for sleeping by getting the academic to ‘aim’ at a different environment without the distraction of emails.

As part of the practice of doing data analysis, interviewee #21 would run a process called DataStream on her office workstation remotely from home. But the experience was the response times were too slow and she felt she was unable to work effectively. To remedy this, she would ‘aim’ at a different physical environment (the office) with an intentionality and body schema associated with this locale and the practice of doing data analysis effectively.

Now that we get an idea of how the model can be applied to the data from McGill, we can look at more examples from the JBS.

As part of the practice of reading, interviewee #37 changed the physical environment from on-screen to paper, because he found the experience of reading on-screen unsatisfactory. His habitual body would mean that he would look for a physical marker, such as a bookmark or bit of paper, in the physical environment (inside a book he would be reading) to know where in the document he left off. There seems to have been a mismatch between the world he ‘aimed’ at and his body schema. Likewise, interviewees #43 and #44 like to have paper documents at proximity to their workstations so that they feel they are at-hand. This is again a result of the experience of working with on-screen and finding it unsatisfactory due to the mismatch between body schema and physical environment. In contrast, interviewees #36, #42 and #48 like to feel like they have their documents on-hand at all times in the Cloud rather than have paper versions near their workstations. They seem to feel they can get immediate access to many drawers anytime anywhere.

We can also observe the model at work at both sites where interviewees #21 and #36 occasionally go to cafés where no Internet is available to be able to concentrate on a

specific document as part of the practice of reading. In both cases, there is an initial mismatch between the body schema and physical environment, and in both cases, the academics choose to change the physical environment, mainly to remove connectivity to the Internet.

An interesting observation about the importance of paper in the practice of reading, is that it is possible that paper allows for a narrower beam (or 'spotlight') for the arc of intentionality since it involves a very defined physical environment – the paper document. This means there is the relative absence of the layered spaces of an on-screen document where the academic feels he can at any moment access many rooms and drawers at will with just a keyboard shortcut. In this sense, the experience of reading on paper and reading on-screen are very different spatially. That said, there is no difference between the layers as they are experienced – an academic reading a paper document could be just as distracted by the smartphone he has sitting next to him as when reading a document on-screen. It is just that paper may be better suited for body schemas which require a narrower focus on the physical environment. We can see what happens when a body schema is forced through intentionality to engage with a mismatched physical environment with the example of interviewee #39 who said he went “cold turkey” when going paperless. This reflects the bad experience of working on-screen, but which under contextual imperatives had to be dealt with by changing the body schema and habitual body to work on-screen. This example also illustrates how experience through practice results in a habitual body – like Merleau-Ponty’s amputees – which is in turn reinforced with continued experience within the same practice.

We can also test the model on instances in the data where ICT is not explicitly present, for example, interviewee #41 likes the Gates Scholar Room for the practices of reading, analyzing and data analysis because she says it allows her to be “inward focused” and take on a certain mindset due to the distinct atmosphere of the room. There seems in this case to be an alignment between intentionality, body schema and physical environment which results in positive experience.

Q: Okay, good, alright. So I was going to start off by just asking you, tell me about your daily routine.

A: My daily routine as a PhD student?

Q: Yes, as a PhD student, perhaps focusing a lot more on your movements

physically like...

A: So I first of all don't have a routine, I think. My research is a little bit unique in that I'm in the field a lot, I'm away a lot in Kenya, so I can tell you about my routine when I'm here. My routine when I'm here is usually I cycle to work. I live close by, I live about ten minutes away, I take a bike and then I... Usually I have two options for myself, I either come here to the PhD office or I go to the Gates Scholar's common room. So I'm part of a scholarship, the Gates Kimber Scholarship, and they have a room that's dedicated to the scholars. It's essentially an office, it's a room where there's tables, computers, it looks a lot like this, and so I kind of alternate in my work routines. If I have to do stuff where I really have to think and really kind of go really deep into theorising, analysing data, just work that's very inward focused, I tend to go to the Gates room where I'm left alone. If it's kind of just, you know, other types of work I come here. I'm usually in here I'd say four days out of the week, usually on average. I usually work here all day. At times, grab a coffee next door, grab a coffee at the business school, meet my supervisor, have other meetings with people. I do a little bit of teaching with the MBA course, so that's also over in the other building. I enjoy the flexibility that everything is so close by, so, you know, I'll also kind of run errands during the day if I need a break, you know. I'll just kind of do my groceries at 3 p.m. in the day, and then like come back here and do work again and just kind of chunk up my day, if that makes sense.

Q: Okay. What is it about working in this office that doesn't, or I'm assuming anyway, it doesn't allow you perhaps the deeper thought processes that you were describing earlier? What's that?

A: It's a good question. I think in part I like to have a dedicated space where I only go when I have to really think things through. So it's almost like I'll walk into that Gates room and it's a mind-set, like I kick into a type of mind-set, and I'm never there unless I have to do really kind of theoretical work. So I think in a way, I'm also trying to create some separation there between the more administrative day-to-day stuff of a PhD and then the kind of, you know, actual deep research. I also think that here the doors are always open between the different rooms. So we do have an officer but we don't have rules of like who speaks when. It's kind of generally understood that we should be quiet but a lot of people kind of end up talking here and there and it's fine, it's totally fine, and we all, you know, it's important to have that community. But we don't have rules for like, okay, at 10 a.m. everybody takes a break and we talk for ten minutes and then we go back to quiet. It's kind of more ad hoc. And so if you're really trying to think deeply, like that can be quite distracting, even though people don't mean to be, but it just sometimes makes it a little hard to stay focused for a long, you know, for like an hour or something like that.

Interviewee #44 feels he can live the myth of the academic's life by going to a café occasionally to work. He likens it to stepping into an idealized image of academic life and being free to work anywhere.

Q: Do you have any other places where you like to work?

A: Within... Like around Cambridge?

Q: Yes, around Cambridge. Anywhere, really.

A: Not at the moment. The only other place, again given the change of the PhD rooms, would be Hot Numbers; which is the café just up the road. Sometimes, even if it's just about sending emails or writing or reading, I like that kind of ambience and vibe that I get from working in a café. I don't know what that is, I don't... It's more than just... It's probably the variety, like the fact that it's a change to what I'm used to. Like there's a very static, kind of, dull, dreary sort of environment for us; over there it feels a lot warmer. It's almost though I can step into an image that I have of like what an academic life could be like. You know, in all it's, kind of, glory and charm. You know you've got that work life balance thing happening and you're able to just work remotely and work... It's almost like I can, like doing that, I'm kind of feeling some sort of myth that I have about like... What it could be like to be an academic. If I get the opportunity and it's, like, not serious work so it could just be emails or reading; I'll make that shift to one of those sorts of environments as well.

We see this in other instances in the data where academics' choice of where to work will correspond to a certain desire for a specific mood. In some cases, as we have already seen, this involves drawing boundaries around certain spaces, such as the home, to keep work separate. The home and office both understandably evoke different moods for academics and each is seen as being associated with different intentionalities and body schemas. Interviewee #25, for example, says "I don't have any advantage from being here, other than the psychological focus" when asked why he chooses to work at the office on a daily basis rather than the home. However, this boundary between home and office isn't necessarily easily transposed to the separation between work and leisure in the expanded space of ICT as we see with interviewees #8 and #13, for example. Academics at both sites struggle to find a balance between work and leisure of ICT. Again, distraction is seen as both a welcome break and unwelcome source of disruption. This tension is also observed with academics struggling to balance socializing and individual work practices such as reading in the office. They enjoy the benefits of social contact with colleagues when in the office, however this socializing can either become a way of procrastinating or take a life of its own with frequent interruptions. Third spaces, such as gardens and cafés can also evoke certain moods, like in the case of interviewee #44, and are therefore associated to a certain body schema. Interviewee #35 says regarding the practice of writing while travelling: "So for me, writing is costly, so I need open my mind to it, and so that's why in the office or home, whatever that is. But travelling for writing is not the best". Interviewees #45 and #48 find that occasional changing of settings for work is helpful for refreshing and energizing their mindset. Interviewee #45 talks about seeking a certain intensity from an environment to

invigorate her mind, whereas interviewee #48 uses the term “fresh brain” when describing what she gets when she changes setting.

We also see that certain moods can be associated with postures of the body. Interviewee #45 likes to read on her bed when working at home. For interviewee #20 it's the sofa. As we've already seen, interviewee #30 likes to read off a tablet in the garden because he feels the posture is more comfortable and appropriate for that practice. Body posture is therefore integral to the body schema. We also observe that clothing can be an integral part of the body schema. Both interviewees #16 and 21 mention working in pyjamas as evoking specific moods with regards to work – in one case repulsion and in the other reassurance. Interviewee #24 complained that wearing a suit – an obligation for teaching executive courses at the JBS – would put him off.

The opposing emotions with respect to wearing pyjamas or a suit may also be linked to one dimension which has not been explicitly considered – time. The rhythms of the organization shape our experience of space. We may welcome the quiet of the evening after everyone has left the office, but on the other hand, we imagine those who have left are enjoying themselves with family and friends. The mood is different and the perception of space shifts. The balance between proximate and remote space may shift as well. We might glance at our messages or social media to see what our friends are up to. In a way, we have left the office with them because our bodies – our habitual bodies – have orientated our bodies towards them. Our intentionality is in sync with the rhythms of organizational life. Just like the ebb and flow of the city (Tuan, 1977). The experience of organizational space is therefore entirely dependent upon the rhythms of the organization itself. Any future study based on the phenomenological model proposed by this study will have to incorporate the dimension of time.

Space is no longer just a question of where we go and sit and work, but also of which doors we discover and open with thanks to ICT. These doors are in our body schemas on top of those doors we see with our eyes while walking down a hallway. As a matter of experience, space is not rendered irrelevant with ICT, but rather it is both collapsed and expanded simultaneously. The combination of proximate and remote spaces for a given practice expands the space in the sense that the individual has at-hand more space



(remote), yet it is collapsed because it is condensed into his experience as being at-hand at the same level as proximate space. Interviewee #30 says, “Everything I have is in the Cloud, so in theory I can work as long as I’ve got Internet access”. This academic has simultaneously expanded and collapsed his workspace by making his documents available anywhere and remotely, while experiencing these objects as being proximate at all times. Academics also use remote space made available by ICT as a way of managing proximate space and somewhat unbinding their practices from it. For example, interviewee #46 says: “And we also have now the iPhone too, so if you want to see the picture of your son, you can still go but not have him there all the time”. It is as if this academic has replaced his desk drawer with a virtual one where he keeps a photo of his son to look at whenever he feels the need.

The simultaneous expansion and shrinking of space, however, presents some very noticeable issues for academics. The fact that so many new objects can potentially be at-hand with ICT means that there are infinitely more potential sources of distraction. Imagine standing in a room with many doors. In this fantasy, new doors pop up while others disappear. Behind these doors there are some perceptibly interesting things going on. So, we enter one, and in it there are also many other doors like the first one. And so on. Soon we feel like we are walking through the Palace of Versailles aimlessly. This purposely spatial representation of cyberspace may seem familiar. We have almost all had the experience of wandering aimlessly on the Internet. Moving from one link to another or one tweet to another. It is a state of mind which is identical to that of discursive thought. This is the state of mind we find ourselves frequently in when we have a succession of thoughts each leading to the next one without any intention. We know that ICT is designed to espouse this (Harris, 2016; Manzerolle, 2014) and this presents some ethical issues which we will look at in Managerial Implications.

We are therefore left with the impression that the question regarding space and ICT isn’t whether you can work anywhere as much as can anywhere work you? The experience of expanded/collapsed space by academics at both McGill and JBS point to new issues being raised about the way organizational space is perceived, physical space is conceived, and how ICT is designed. The unsettling experience of space provoked by ICT pushes academics to separate their devices into those for ‘fun’ and those for ‘work’. We

also see others who seek places where there is no connectivity to the Internet. These new walls are being 'built' because the experience of space has been significantly altered by ICT. Understanding the relationship between ICT and experienced space in organizations is imperative to ensure workers can find a balanced mental state which leads to their increased well-being.

Are the results of this study surprising? Yes and No. As remarked in the introduction, we intuitively feel our experience of space shift with ICT, however we cannot quite figure out what it is. When we try to understand, we are quick to point to physical manifestations of changes in the environment due to the presence of ICT. We have seen that new charging points and Wi-Fi hotspots are often cited as material changes. However, without the right conceptual apparatus, we will be blind to the reality of experience and remain trapped in a technologically deterministic view of the world. For example, the attachment to paper which was made evident by academics at both McGill and the JBS was surprising. I expected academics to be eager to go paperless and free themselves of what I personally felt was unnecessary weight. It was principally this surprise – as Weir and Iedema et al. (2010; 2010) recommend – which provided the most substantive body of evidence distinguishing the experience of working with ICT (reading on-screen) and without ICT (reading a paper document). Another consequential surprise was the discovery that most academics don't take advantage of Cloud-based collaborative tools to work on the same document simultaneously. This surprise forced me to abandon the focus of the study on collaborative practices and take into account a wider array of practices.

#### **4.4.1 Contributions**

The clearest contribution from this study is the critique of affordance theory for the study of ICT. The evidence strongly supports the discontinuity between instantiation and perception of affordance when dealing with penetration of ICT in the environment (Kallinikos, 2003; Oliver, 2005). This is a deficiency which needs to be recognized in a literature which tends to uncritically mobilizes affordance for the study of ICT (Anderson & Robey, 2017).

The findings of this study show how academics' experience of space, while engaged in a practice, shapes their bodily movements, and how this in turn shifts their experience. The experience of space is the result of phenomenological engagement of the body in the world, this engagement being directed at a certain physical environment. From these findings emerge the contribution in the form of an alternative model based on Merleau-Ponty's phenomenology of perception (1976). This model addresses the critical deficiency in the theory of affordance identified above. Being focused on the experience of individuals, rather than the physical environment (ICT artefact included), a phenomenological approach is better able to take into account the reality of everyday interaction with ICT artefacts and what effect this may or may not have on organizational space. Such a model could be useful in studies of experiential computing for instance (Dourish, 2004; Introna & Ilharco, 2006; Yoo, 2010). Some further avenues for future research based on this model are suggested in the next sub-chapter.

Another possible contribution is inciting sociomateriality and process studies to push beyond the theory of affordance to reconcile the object-subject and ideal-real dualisms by taking a phenomenological stance.

As we set out in the beginning to generate hypotheses (Benbasat et al., 1987), the following propositions can be developed from the model based on Merleau-Ponty (1976):

1. ICT is part of the physical environment with proximate and remote components
2. ICT, as part of the physical environment, affects experience by both collapsing and expanding perceived space
3. ICT acts as a point of convergence for experience in the physical environment

These propositions can be tested in future studies, as I will propose next.

#### 4.4.2 Avenues for future research

Although the resulting model based on Merleau-Ponty's phenomenology of perception<sup>8</sup> seems to be supported by the data, it will need to be thoroughly tested empirically with new studies. The model could be further refined and a starter coding structure could be developed using the existing dataset. The component of **habitus** is of particular interest, given it is the repository of renewable action and will likely be determinant in how organizational space is experienced.

The propositions put forward in the previous sub-chapter should be tested against new data as part of a new study. This study could be composed of cases of other types of organizations. Based on the contributions of this study, we could formulate the original question as: How are ICTs shaping the experience of organizational space?

Another possibility would be to study how virtual reality shapes the experience of space, since, as far as experience is concerned, ICT opens new doors to new spaces. Technologies, such as virtual reality, allowing for some form of dis-embodied presence allow for a very different mode of production of space (O'Neill, 2009). According to some, virtual reality experiences are incapable of producing places of meaning that are possible in the embodied experiences of everyday life (Turner, Turner, & Carroll, 2005). This seems to be supported by the data in this study, however the notion of embodiment could be radically shifted with rapid advances in virtual reality technology and artificial intelligence.

#### 4.4.3 Limitations

The emergent nature of this study – especially the theoretical journey – can be seen to be a weakness. In choosing an under-theorized area to study, there is always the risk of adapting an unsuitable theoretical framework from the existing literature. This was the risk I took in engaging with Lefebvre at the beginning. In reading *La Production de l'espace*, it seemed difficult to me to conceptualize ICT as part of his analysis. In choosing

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<sup>8</sup> See Figure 53

affordance, as it is used in Leonardi (2011), the risk presented was different in nature. Leonardi's study was not based on the practices, but routines, of automotive engineers. The relationship between routines and practices is tenuous. While a practice can be composed of routines, it is unlikely they are equivalent. Routines – even if they are flexible – can be confused with a set sequence of pre-determined actions. In the case of practices, actions are guided by an over-arching purpose which can produce variations in resulting actions or routines. Although Leonardi's flexible routines can be seen as practices, it introduces a certain semantic confusion which can be a weakness.

The problem with affordance should have been evident at the beginning. It was hoped that Gibsonian affordance would have emerged in the data. This was disappointing, of course. Having been more vigilant earlier in the process may have helped realize the implausibility of affordance. It should have been more forcefully confronted during the literature review and at the end of the analysis of the McGill case when the triadic causal model was developed. This would have allowed me to test the model I developed based on Merleau-Ponty (1976) with a large dataset. Critiques of the appropriation of affordance following a similar line of argument as the one in this study have already been made (Oliver, 2005; Parchoma, 2014). The frustration with the process of conceptualizing the relationship between space and ICT and the desire to forge ahead with data collection were factors in making this judgement. On the other hand, the critique's posited by both Oliver and Parchoma aren't as forceful on their own without empirical data to support their arguments. It is important in the scientific process to prove oneself wrong in order to progress. In this case I was wrong about choosing affordance, but at least I am certain that I was wrong, especially given it is based on empirical data. My critique of affordance is hence more robust.

Although not entirely absent, and implied in the consideration of practices, the dimension of time did not figure prominently in this study. As we see towards the end of the discussion, temporal rhythms and cycles affect the experience of academics and modulate that of space. The decision to not incorporate time in the framework was sensible given how difficult theorizing space is. However, it is important to note that without time, there is no space. By not considering it in our framework, we may deprive ourselves of interesting insights on variations in patterns in the data.

A specific limitation of the proposed model based on Merleau-Ponty (1976) is that Practice is an independent variable. How is practice itself changed by experience? Can intentionality direct the body schema towards the practice itself to modify it? What is the role of habitus in maintaining practice? These questions show that this model needs further development with further inquiry.

Before embarking on this study, I considered Yin's four tests to determine the quality of case studies for the research design. All four were addressed by using tactics Yin suggests, however it is perhaps on reliability that this study is weakest. A case-study protocol wasn't produced with the detail required for the study to be repeated. A case-study protocol could be produced using data stored in the case-study database and tools such as NVivo, however some critical details, especially regarding field decisions, would likely be missing.

#### **4.4.4 Managerial Implications**

As we have seen earlier in the discussion, some ethical questions are raised by the intentional design of attention grabbing and habit-forming ICT. According to the logic of the 'attention economy', industry seeks to maximize time spent on websites and applications to maximize profits. This results in the design of a choice architecture that results in people spending more and more time on their connected devices and feeling they are wasting their time in the end. This concurs with my experience. I feel that over-stimulus from the expanded space of ICT can be disruptive. Notifications on devices are the equivalent of having people slipping notes on your desk at regular intervals or, worse, knocking on the door every 5 minutes. Even my iTunes refreshing on the second screen on my desk will distract me momentarily from the first one where I am working. This level of distraction has implications for employers and the well-being of their employees. How would you like to have a person dropping notes on your employees' desks every five minutes? Designers, employers and the general public should be made more aware of the intentional nature of this phenomenon. One interviewee at McGill suggested that designers should make it possible for users to partition their devices into 'spaces' such that it can be put into a mode where only professional apps are available

and able to send notifications. Perhaps a profile can be created for each type of 'space'. We observe that this suggestion replicates the existing partitions in the physical environment. State regulation could be a solution as well, such as the French government's decision to grant to citizens the legal right to 'switch off' after office hours (2016a). This means employers are no longer able to legally oblige workers to stay connected to their emails after working hours. This is a first step in recognition of the problem, but there needs to be a wider discussion about the ethics of the 'attention economy' and its effects on the well-being of the general public.

A more direct consequence – and evidence supporting the argument of this study – are the new risks the altered experience of space pose for the general public. I have numerous times been involved in near-miss situations with motorists or pedestrians completely absorbed in their mobile device and distracted from their driving or walking. Needless to say how dangerous this is, but such behaviour is commonplace. At least one city has taken action by installing signalling for pedestrians embedded in the pavement (Noak, 2016). The new risks presented by altered perception of space due to ICT need to be recognized by both public officials and managers.

## 5 General Conclusion

The point of departure for this study was a realization that my experience of space would not be the same depending on whether I was engaging with ICT or not. This was a realization which struck me as particularly poignant given how much time is spent by many of us engaged intimately with ICT. I was particularly intrigued by how this was experienced by office workers. How does the worker experience space in these conditions? How do workers interact with the immediate physical environment when they are staring at their screens? How is the experience of space produced, and what is the role of ICT in producing it? How is organizational space affected? These questions were asked against the backdrop of technological determinism in both the public discourse and scholarship that assumes technology as overcoming distance and making space irrelevant for organizations.

The study began with an exploratory phase with the wider research question looking at how ICT and organizational spaces shape each other in business schools. Some preliminary fieldwork and further review of the literature then yielded the following research question which was maintained for the rest of the study: How does ICT afford the spatial practices of organizations?

First, the results demonstrate the inadequacy of affordance for the study of ICT given the latter's nature. Although this inadequacy has already been identified by some scholars, we have been able to demonstrate with this study how, in practice, affordance is unable to explain the relationship between the properties of ICT and the perception of the possibilities it offers.

Second, the findings show how academics' experience of space, while engaged in a practice, shapes their bodily movements, and how this in turn shifts their experience. The experience of space is the result of phenomenological engagement of the body in the world, this engagement being directed at a certain physical environment. Hence, the study proposes an alternative perspective based on the phenomenology of perception of Merleau-Ponty. A model, grounded in the findings, is proposed and successfully tested against the data. This alternative perspective suggests that, based on the experience of



academics, ICT simultaneously collapses and expands space. ICT acts as a point of singularity where proximate and remote spaces converge to produce a singular sphere of experience. The study further develops Merleau-Ponty's concepts of intentionality, body schema, habitus, knowing body, and habitual body in the context of the spatial practices of academics. I propose abandoning affordance theory in favour of an experiential approach to understand the relationship between organizational space and ICT.

I propose testing the alternative model in a future study of organizational spaces and practices. For this future study, I propose the following research question: How are ICTs shaping the experience of organizational space? I also propose studying the effects of virtual reality technologies on the experience of space.

Some managerial implications are put forward. I suggest there is an ethical issue to be addressed regarding how ICT is designed to alter our experience of space to monopolize our attention as part of the 'attention economy'. I argue that the wellbeing of employees and the general public are at stake and that such distractive potential sitting on our desks can cost organizations and society dearly.

I therefore challenge the dominant narrative that organizational space is being collapsed by ICT and rendering it less relevant. As a matter of experience, space is not rendered irrelevant with ICT, but rather it is both collapsed and expanded simultaneously. The combination of proximate and remote spaces for a given practice expands the space in the sense that the individual has at-hand more space (remote), yet it is collapsed because it is condensed into his experience as being at-hand at the same level as proximate space. Organizational space has never been more relevant with the exponentially increasing hours we spend staring into a screen.

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## 9 Appendices

### 9.1 Interview Protocol

#### Interview Protocol – Intensive Phase

##### **Opener :**

So, what I'll start with is just asking you to describe your workspace, or workspaces, places where you work? And how you organize your work and your time between these workspaces?

##### **Workspaces :**

Do you have a home office?

Describe to me a little bit your home office. How are you equipped? What kind of setup do you have?

Is there anything specific here at the office that you have that you won't have at home?

Proportionally speaking, how would you say you divide work between office and home?

What is it about the office here that encourages you to come here every day on a regular basis ?

What types of tasks do you prefer to do in each location?

Are there any specific things that you would prefer doing at home than in the office or vice versa?

What kind of software tools do you require? Do you do a lot of statistical number crunching or anything like that? That requires a lot of processing power?

**Printing :**

Do you print a lot?

What kind of printing facilities do you have?

Would you come to the office for printing?

**Mobility :**

How about on the go? How do you stay connected ?

Regarding teaching, when you go to the classroom, what do you take with you, how do you manage your connectivity there for example? Do you use a USB key ?

What do you bring with you in terms of equipment on your business trips ?

How do you stay connected?

**Being an academic :**

What is it that you appreciate the most about your profession, being an academic, in terms of perhaps freedom of working wherever you... You know, wherever you want? What is it exactly that, you know, you appreciate the most?

**Closer :**

Is there anything else you could think of about technology and how you manage your space with regards to work ?

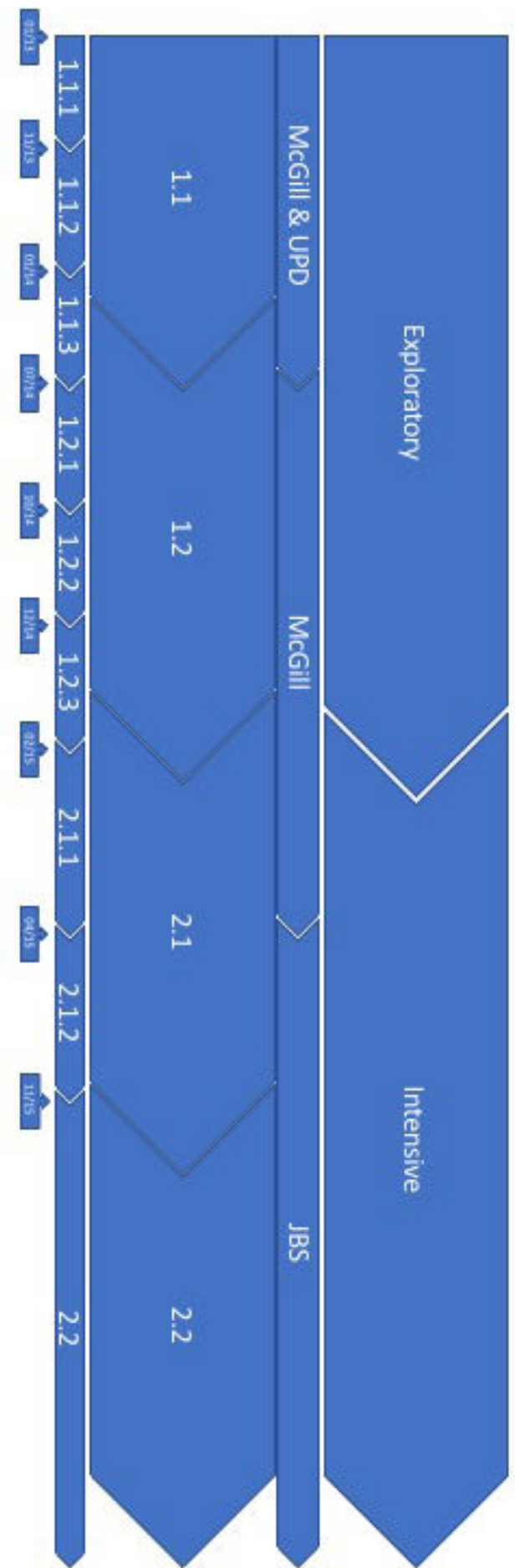
If you could dream up the perfect working arrangement spatially and using technology, what would it be for you?



## 9.2 IS Literature Search for Organizational Space – Table of Results

Accept/Reject	Year	Author(s)	Title	Journal	Bibliographical Database(s)	Reason(s) for its selection / rejection	Search execution date	Search file
A	2012	Williams & Pollock	Research Commentary—Moving Beyond the Single Site Implementation Study: How (and Why) We Should Study the Biography of Packaged Enterprise Solutions	Information Systems Research	ISI	Addreses organizational space for organizations scattered over many physical sites	11/08/13	ABS
A	2012	Montero & Roland	Trans-situated use of integrated information systems	European Journal of Information Systems	ISI	Addreses organizational space for organizations scattered over many physical sites - more interested in context	11/08/13	ABS
A	2012	Montero & al	The family resemblance of technologically mediated work practices	Information and Organization	ISI	Addresses organizational space for organizations scattered over many physical sites and more specifically, technologically mediated, space-separated work practices emerging over time	11/08/13	ABS
A	2012	Mervyn & Allen	Sociospacial context and information behavior: Social exclusion and the influence of mobile information technology	Journal of the American Society for Information Science and Technology	ABI/INFORM, EBSCO Host, ABI/INFORM, ISI	From an information science perspective. Describes the lack of research on the influence of technology in physical spaces	11/08/13	ABS
A	2011	Saunders et al.	Virtual Space and Place: Theory and Test	MIS Quarterly	ABI/INFORM, EBSCO Host, ISI	Focus is on Virtual Space and Place (VSP) although excellent literature review of space theory	11/08/13	ABS
A	2011	U. & Robertson	Physical space and information space: studies of collaboration in distributed multi-disciplinary medical team meetings	Behaviour & Information Technology	EBSCO Host, ISI	Discusses the relationship between physical space and ICT practices	11/08/13	ABS
A	2010	Yoo	Computing in Everyday Life: A Call for Research on Experiential Computing	MIS Quarterly	EBSCO Host, ISI	Argues for more research on experiential computing from the sociomaterial perspective with a strong spatial component	11/08/13	ABS
A	2010	Majchrzak & Jarvenpaa	Safe Contexts for Interorganizational Collaborations Among Homeland Security Professionals	Journal of Management Information Systems	ABI/INFORM, ISI	Although mainly focused on inter-organizational space, does discuss the relationship between physical space and virtual space	11/08/13	ABS
A	2008	Ren et al.	Multiple Group Coordination in Complex and Dynamic Task Environments: Interruptions, Coping Mechanisms, and Technology Reconfigurations	Journal of Management Information Systems	ABI/INFORM, ISI	Not focused on organizational spaces, however does discuss spatial issues regarding coordination	11/08/13	ABS
A	2008	Leonardi & Bailey	Transformational technologies and the creation of new work practices: Making implicit knowledge explicit in task-based offshoring	Journal of Management Information Systems	ISI	Discusses knowledge and informational flows in organizational spaces	11/08/13	ABS
A	2008	Jin & Robey	Blending social and technical interfaces in organizations: An interpretive analysis of time-space dislocation	Mis Quarterly	ISI	Discusses spatial issues around distributed work	11/08/13	ABS
A	2007	Biocca et al.	Attention issues in spatial information systems: Directing mobile users' visual attention using augmented reality	Information and Organization	ISI	Although not focused on organizational space, does discuss the relationship between physical space and virtual space	11/08/13	ABS
A	2005	Evans & Brooks	Understanding collaboration using new technologies: A structural perspective	Journal of Management Information Systems	ISI	Discusses spatio-temporal issues of IS using Giddens' Structuration Theory	11/08/13	ABS
A	2004	Sarker & Sahay	Implications of space and time for distributed work: an interpretive study of US-Norwegian systems development teams	European Journal of Information Systems	ABI/INFORM, ISI	Discusses spatio-temporal issues of virtual teams	11/08/13	ABS
A	2003	Espinosa et al.	Team boundary issues across multiple global firms	Journal of Management Information Systems	ABI/INFORM, ISI	Although mainly focused on temporal aspects of distributed IT work, does discuss organisational space	11/08/13	ABS
A	2002	Nandhakumar	Managing Time in a Software Factory: Temporal and Spatial Organization of IS Development Activities	The Information Society: An International Journal	ISI		11/08/13	ABS
A	2002	Larsen & McInerney	Preparing to work in the virtual organization	Information & Management	ABI/INFORM, ScienceDirect, ISI	Discussing Virtual Organizations (VOs) mediated by ICTs	11/08/13	ABS
A	2002	Chalmers	Awareness, Representation and Interpretation	Computer-Supported Cooperative Work: The Journal of Collaborative Computing	EBSCO Host, ISI	Space and place in CSCW	11/08/13	ABS
A	2001	Lucas Jr., Henry C	INFORMATION TECHNOLOGY AND PHYSICAL SPACE	Communications of the ACM	EBSCO Host, ABI/INFORM, ISI	Directly on topic and from IS Journal	09/08/13	TITLE, ABS
A	2001	Lurey & Raisinghani	AN EMPIRICAL STUDY OF BEST PRACTICES IN VIRTUAL TEAMS	Journal of Management Information Systems	EBSCO Host, ISI	Discusses spatio-temporal issues of virtual teams	11/08/13	ABS
A	2000	Davenport & Higgins	Narratives of New Media in Scottish Households: The Evolution of a Framework of Inquiry	Journal of the American Society for Information Science	EBSCO Host, ISI	Mainly focused on spaces of households but discusses intercession with work space as well	11/08/13	ABS
A	1999	Ramnarapu et al.	The analysis and study of the impact of technology on groups: A conceptual framework	International Journal of Information Management	ABI/INFORM, ISI	Spatio-temporal discussion of CSCW	11/08/13	ABS
A	1996	Besser & Born	Impact of Distance Independent Education	Journal of the American Society for Information Science (1986-1998)	ABI/INFORM, ISI	Organisational space in a university environment	11/08/13	ABS
A	1995	Nosek & Shephard	Making groupware payoff: The British model	Association for Computing Machinery, Communications of the ACM	ABI/INFORM, EBSCO Host, ISI	CSCW and VO in Britain	11/08/13	ABS
A	1988	Dennis et al.	Information Technology to Support Electronic Meetings	MIS Quarterly	EBSCO Host, ABI/INFORM, ISI	GDSS and CSCW in organisations	11/08/13	ABS
A	1986	Gordon	Telecommuting: Planning for a New Work Environment	The Journal of Information Systems Management	ABI/INFORM, ISI	The implications of ICT on office spaces	11/08/13	ABS
A	1984	Oades	Rearranging Your Office	Data Processing	ABI/INFORM	The implications of ICT on office spaces	11/08/13	ABS

### 9.3 Fieldwork Phase Timeline



## 9.4 Table of Interviews – Exploratory Phase

Phase	Sub-phase	Interview ID	Site	Date	Time	Duration (mins)	Location	Description of environment and conditions for interview
Exploratory	1.1	1	McGill	03/01/13	?	30	Office in the Bronfman Bdg	
Exploratory	1.1	2	McGill	15/05/13	?	90	Skype (Paris-Montreal)	
Exploratory	1.1	3	McGill	08/11/13	?	45	Office in Bronfman Bdg	
Exploratory	1.1	4	McGill	19/11/13	14:00	60	Le Prep (SSMU building) and Humble Lion Café	Initial meeting at Le Prep in the SSMU building and then moved to a café on Sherbrooke street
Exploratory	1.1	5	Dauphine	21/01/14	?	60	Office	
Exploratory	1.1	6	Dauphine	28/01/14	?	45	Office meeting room	
Exploratory	1.2	7	McGill	25/07/14	14:30	80	Office	Ground floor office of Bronfman bldg. No other occupants.
Exploratory	1.2	8	McGill	23/10/14	8:45	41	HSSL - M3-17A	McLennan library 3rd floor group work room
Exploratory	1.2	9	McGill	23/10/14	14:45	50	PhD lounge 5th floor Bronfman	
Exploratory	1.2	10	McGill	24/10/14	9:00	30	Café Castel	
Exploratory	1.2	11	McGill	24/10/14	11:30	25	Office	
Exploratory	1.2	12	McGill	08/12/14	12:00	22	Room floor Bronfman	
Exploratory	1.2	13	McGill	11/12/14	11:10	15	PhD lounge 5th floor Bronfman	
Exploratory	1.2	14	McGill	11/12/14	16:00	12	Room 533 Bronfman Bdg	
Exploratory	1.2	15	McGill	11/12/14	17:00	14	Room 561 Bronfman Bdg	

## 9.5 Table of Interviews – Intensive Phase 2.1 McGill

Phase	Sub-phase	Interview ID	Site	Date	Time	Duration (mins)	Location	Description of environment and conditions for interview
Intensive	2.1	16	McGill	18/02/15	14:00	20	Room 319 Bronfman Bldg	Very neat and tidy office
Intensive	2.1	17	McGill	27/02/15	10:00	46	Room 475 Bronfman Bldg	
Intensive	2.1	18	McGill	22/02/15	14:00	24	Cafe Castel	
Intensive	2.1	19	McGill	23/02/15	11:00	30	Room 573 Bronfman Bldg	Bare walls.
Intensive	2.1	20	McGill	24/02/15	11:00	23	Room 569 Bronfman Bldg	More cluttered office than other academics at Bronfman Bldg. Paper archives and books mainly. Two screens.
Intensive	2.1	21	McGill	25/02/15	10:30	28	Room 472 Bronfman Bldg	Fridge and sofa-bed
Intensive	2.1	22	McGill	25/02/15	13:00	37	Room 471 Bronfman Bldg	
Intensive	2.1	23	McGill	26/02/15	10:30	39	Room 574 Bronfman Bldg	

## 9.6 Table of Interviews – Intensive Phase 2.1 JBS

Phase	Sub-phase	Interview ID	Site	Date	Time	Duration (mins)	Location	Description of environment and conditions for interview
Intensive	2.1	24	JBS	21/04/15	9:30	38	A2.05	Quiet & cosy office. Very interesting decor. A lot of rowing paraphenalia
Intensive	2.1	25	JBS	21/04/15	15:00	30	A3.04	Clean, but austere office
Intensive	2.1	26	JBS	22/04/15	11:30	52	A.0.10a	Cosy corner office
Intensive	2.1	27	JBS	22/04/15	12:53	10	Cafe/Common Room	Bay next to till of cafe. Noisy and busy. Feeling hurried.
Intensive	2.1	28	JBS	22/04/15	13:05	25	Cafe/Common Room	Bay next to till of cafe. Noisy and busy. Feeling hurried.
Intensive	2.1	29	JBS	22/04/15	13:30	45	Walking throughout the main building	Relaxed walk with many interruptions for custodial duties
Intensive	2.1	30	JBS	22/04/15	17:00	32	A.1.06	Large bright office. Very tidy. Many momentos from Chinese visitors along with other souvenirs
Intensive	2.1	31	JBS	23/04/15	10:15	36	C2.02	Large bright office. Very corporate feel. Appointment for interview was taken by assistant.
Intensive	2.1	32	JBS	23/04/15	12:00	34	A.3.06	Large office. Overlooking back parking. Cold at first because of open window.
Intensive	2.1	33	JBS	23/04/15	15:45	65	W.4.03a	Hidden away in a stairwell. Used to be a storage room. Very high ceiling, but cramped. Very warm and bright with direct exposure to sunlight.
Intensive	2.1	34	JBS	24/04/15	10:30	31	A.2.09	Large but cosy office space tucked away in a corner. Cluttered with a lot of paper
Intensive	2.1	35	JBS	24/04/15	11:30	60	A.0.10	Large office - awkward layout.
Intensive	2.1	36	JBS	24/04/15	14:00	38	A.3.08a	Very large and bright office with big windows. Not as tidy as other offices. Some doors connecting to adjacent offices
Intensive	2.1	37	JBS	27/04/15	14:00	48	C2.01	Very large corner office, but dark. Many piles of paper on desks around the perimeter of the space.
Intensive	2.1	38	JBS	28/04/15	11:00	18	A.2.03	Very dark and austere office. Would almost seem uninhabited
Intensive	2.1	39	JBS	08/05/15	10:00	70	Lobby of Hôtel Splendid Etoile, Paris	Plush and conservative interior space.

## 9.7 Table of Interviews – Intensive Phase 2.2 JBS

Phase	Sub-phase	Interview ID	Site	Date	Time	Duration (mins)	Location	Description of environment and conditions for interview
Intensive	2.2	40	JBS	09/11/15	9:47	40	W.4.04	Meeting room at JBS
Intensive	2.2	41	JBS	09/11/15	11:48	34	10 Trumpington Street - B.10.1	Visio conference room
Intensive	2.2	42	JBS	09/11/15	13:54	18	10 Trumpington Street	Meeting room
Intensive	2.2	43	JBS	09/11/15	14:40	34	10 Trumpington Street - B.10.1	Visio conference room
Intensive	2.2	44	JBS	09/11/15	16:49	47	10 Trumpington Street - B.10.1	Visio conference room
Intensive	2.2	45	JBS	09/11/15	17:33	11	10 Trumpington Street - B.10.1	Visio conference room
Intensive	2.2	46	JBS	10/11/15	11:13	42	W.4.06	Meeting room at JBS
Intensive	2.2	47	JBS	10/11/15	13:25	18	10 Trumpington Street - B.10.1	Visio conference room
Intensive	2.2	48	JBS	10/11/15	15:22	32	W.4.06	Meeting room at JBS

## 9.8 Long summary of the dissertation in French – Résumé substantiel de la thèse en français

**Cette thèse part d'un double constat.** D'une part, le développement des TIC dans les organisations et pratiques de travail conduit au sentiment partagé que l'espace propre au travail deviendrait superflu, se rétrécirait à l'espace de son écran d'ordinateur ou de smartphone. D'autre part, les organisations consacrent de plus en plus de réflexion et de ressources à aménager leurs espaces de travail, en raison de la prise de conscience de l'impact de ces espaces sur le travail effectué par leurs usagers et, bien entendu, en raison de contraintes économiques croissantes. Malgré ces constats, il est notable de relever le peu d'attention que les recherches en systèmes d'information ont porté à la question de l'espace organisationnel, ainsi que le poids du déterminisme technologique dans ces recherches. Dans de nombreuses professions, les interactions de plus en plus fréquentes avec un certain nombre d'artefacts technologiques, d'outils de communication à distance viennent perturber l'expérience du lieu de travail. Comment interagit-on avec son environnement physique immédiat tout en étant plongé dans son écran toute la journée ? Quelle est l'expérience de l'espace ainsi produite, et quels rôles ont les TIC dans la production de cette expérience ? Si les études en théorie des organisations s'intéressent depuis plusieurs années à la question de l'espace (Clegg & Kornberger, 2006 ; Dale & Burrell, 2007 ; Warf, 2009), il n'en va pas de même pour la littérature en Systèmes d'Information. L'espace y est bien souvent considéré de manière implicite et secondaire, dans les recherches sur les interactions homme-machine, sur la mobilité, le télétravail. Cette étude cherche ainsi à comprendre la relation entre espace organisationnel et TIC, en explorant les pratiques spatiales de chercheurs affiliés à deux écoles de management. L'objet de cette thèse est d'observer et d'analyser les pratiques spatiales des universitaires, en regardant plus spécifiquement le rôle que les TIC ont dans la manière dont elles se forment et plus généralement comment cela contribue à une expérience de l'espace singulière. D'une question de départ très générale sur la relation entre espace organisationnel et TIC dans les écoles de management, la **question de recherche** de la thèse est ainsi formulée : **Comment les nouvelles affordances des TIC s'expriment-elles dans l'expérience de l'espace organisationnel ?**

Le **chapitre théorique** présente la revue de littérature et l'élaboration d'un cadre théorique qui a permis de structurer la démarche, avant et pendant le travail de terrain. Une première section présente la littérature sur l'espace organisationnel, à partir d'une référence séminale, celle de l'ouvrage d'Henri Lefebvre (1974), à partir duquel s'est élaboré ce courant de recherche. De cette littérature, nous retenons notamment la notion de « pratiques spatiales », essentielle pour circonscrire notre objet d'étude sur le terrain. Une pratique spatiale est, de manière concise, toute pratique pouvant être décomposée en mouvement et relations spatiales. Dans les organisations, marcher est une pratique spatiale – un ensemble de mouvements corporels répétés afin de se rendre d'un point à un autre, accompagné de relations sociales directes ou indirectes (marcher avec quelqu'un pour aller à une réunion et discuter son objet ; marcher pour aller voir un collègue ou accomplir une tâche ; marcher pour se détendre et délier ses pensées). Tenir une réunion, être assis à son poste de travail ; discuter autour de la machine à café – autant de pratiques spatiales qui constituent l'expérience de l'espace au sein des organisations. A ce stade, cependant, cette approche ne permet pas de faire le lien avec les TIC, qui pourtant impactent de plus en plus les pratiques spatiales organisationnelles.

Afin d'affiner notre objet d'étude, nous nous sommes penché sur la notion d'affordance, développée dans le champ des Systèmes d'Information par Paul Leonardi (2011) à partir de la conceptualisation initiale de James J. Gibson (1979) dans le champ de la Psychologie Ecologique. Gibson définit l'affordance comme la relation entre les propriétés physiques de l'environnement et la perception de ce que cet environnement physique offre en termes d'actions, à celui qui perçoit. L'étude de Leonardi portait sur la technologie de simulation assistée par ordinateur et son apport au design automobile. Dans cette perspective théorique, les TIC offrent des possibilités d'action à un individu, et la perception ou non de ces possibilités dépend de facteurs contextuels – les propriétés de l'environnement physique, la qualité de l'attention du sujet par exemple. Concernant notre objet d'étude empirique, cette approche nous a conduit à considérer les TIC dans leur diversité, sans se limiter à un seul type d'artefact technologique. Conscient du risque de considérer les TIC comme une boîte noire (Orlikowski & Iacono, 2001 ; Weber, 2003), nous avons prêté une attention particulière, dans les phases de collecte de donnée et d'analyse du terrain, à distinguer les différents artefacts et fonctions des TIC qui ont émergé du terrain, afin de



comprendre comment ils sont encastrés dans un environnement physique plus large, dans le contexte d'une pratique spécifique.

**Le design de recherche** a été élaboré pour répondre à la problématique énoncée et tester le cadre théorique élaboré. Le choix du terrain répond à un premier enjeu de la problématique : chercher un cas où le rapport à l'espace organisationnel soit un enjeu pour les acteurs et où les TIC sont utilisées de manière intensive. Le cas de chercheurs universitaires en sciences sociales, affiliés à une école de management, permet de répondre à cet enjeu. Les chercheurs en sciences sociales, quand ils ne sont pas sur le terrain, ne sont pas liés à un lieu de travail en particulier. Par rapport à la plupart des professions de service et des employés de bureau, ils bénéficient d'une liberté plus grande quant à l'organisation de leur travail dans le temps et l'espace. D'autre part, l'usage des TIC est central dans leur travail, pour la recherche d'information, la lecture, l'écriture, la communication entre collègues. De ce fait, il apparaît propice d'étudier ce cas singulier d'une population fortement liée aux TIC dans la réalisation de leur travail, mais faiblement lié à un espace de travail spécifique. L'impact entre les pratiques spatiales et les TIC ne devrait en être que plus fort. L'université étant également un monde ouvert et constitué de chercheurs, c'était un choix propice pour entreprendre une démarche ethnographique et avoir accès assez facilement aux acteurs et organisations. Considérant demande de plus en plus forte de flexibilité quant aux modalités d'organisation du travail, dans un nombre grandissant de secteurs et contextes de travail, le cas très spécifique des écoles de management nous semble pertinent pour penser la transformation des contextes plus traditionnels.

Une étude de cas multiple portant sur deux écoles de management a été menée, le premier cas étant la Faculté Desautels de Management de l'Université McGill (Montréal, Canada) et le second, la Judge Business School de l'Université de Cambridge (Royaume-Uni). Nous avons choisi d'adopter une démarche ancrée et abductive dans la mesure où notre objet d'étude relève d'un champ manquant encore de théorisation. Ainsi, la première phase de terrain exploratoire a permis d'analyser les pratiques spatiales et les usages des TIC de manière assez naïve, de faire émerger les premières catégories d'analyse et *in fine* de construire le modèle fondé sur la théorie de l'affordance. Cette phase intensive a permis de tester, affiner et finalement refonder le modèle développé suite à la première phase exploratoire de terrain. Durant les deux phases, les données ont été collectées lors d'entretiens, mais aussi

par l'observation de pratiques consignées dans des cahiers de bord, mais aussi des photographies, des documents et des artefacts physiques.

**Les résultats** montrent que l'approche théorique par l'affordance ne permet pas de rendre compte de manière satisfaisante des relations entre espace organisationnel et TIC. De manière plus générale, la théorie de l'affordance (fondée sur la conception gibsonienne) se révèle inadéquate pour l'étude des TIC de manière générale. En effet, la littérature en SI s'est appropriée la notion d'affordance en mettant de côté un aspect pourtant crucial de la façon dont les individus perçoivent leur environnement – celui de l'expérience antérieure. Une affordance est une propriété réelle, émanant d'une perception visuelle, d'un objet pouvant avoir une valeur utile pour son observateur ; c'est une possibilité d'action dans un environnement donné. De la perception de cette propriété, découle une ou plusieurs possibilités en termes d'action. Ainsi, si nous percevons qu'un objet de petite taille sera préhensible, au contraire d'un grand objet. Dans un tel contexte, il n'est pas besoin d'une expérience antérieure de l'objet pour lier sa taille à la possibilité de préhension. Les affordances sont clairement liées à des perceptions visuelles contextualisées, liant ainsi intimement la forme perçue à la fonction suggérée. Or, suivant Kallinikos (2012), nous estimons que dans le cas des TIC, leur nature physique est celle d'une séparation de la forme et de la fonction : rien dans la perception visuelle d'un téléphone ne suggère qu'il s'agisse d'un moyen de communication à distance, sans expérience préalable de ce même type d'objet. De la même manière, la perception visuelle d'un ordinateur de bureau ne suggère pas les possibilités d'action en termes d'écriture, lecture, de jeu, mais peut inviter l'observateur naïf à s'asseoir sur l'unité centrale ou encore à poser un document contre l'écran pour l'avoir à hauteur du regard. Or les fonctions et les possibilités d'action recelées par les ordinateurs et autres smartphones dépassent considérablement les affordances au sens strict tel que développé par Gibson.

De ce fait, nous avons été amené à rechercher une autre perspective théorique pour rendre compte de manière plus satisfaisante de la relation entre TIC et espace organisationnel. C'est chez Merleau-Ponty et son travail autour de la phénoménologie de la perception que nous trouvons de quoi constituer la base d'un travail de plus grande ampleur sur la relation entre TIC et espace organisationnel.

Nous proposons une perspective alternative reposant sur la phénoménologie de la perception de Merleau-Ponty. Au regard des 2 cas étudiés, cette approche suggère que les TIC ont un double effet : elles replient et étendent l'espace simultanément. Les TIC constituent un point focal où les espaces proches et éloignés convergent pour produire une unique sphère d'expérience. Notre étude développe les concepts merleau-pontiens d'intentionnalité, de schéma corporel, d'habitus, de corps-connaissant et corps habité dans le contexte des pratiques spatiales des chercheurs. Nous proposons d'abandonner la théorie de l'affordance au profit d'une approche expérientielle pour comprendre la relation entre espace organisationnel et TIC. Merleau-Ponty (1976) fournit un ensemble de concepts permettant de lier l'expérience à l'environnement physique : l'intentionnalité, le schéma corporel, le corps connaissant, l'habitus – ces notions sont toutes mobilisées dans la production d'une expérience de l'espace dans le contexte d'une pratique. Les résultats de nos études de cas montrent comment l'expérience de l'espace des universitaires, quand ils sont engagés dans une pratique, donne forme à leurs mouvements corporels, leurs postures, ce qui en retour modifie leur expérience. L'expérience de l'espace résulte de l'engagement phénoménologique du corps dans le monde, engagement dirigé vers un environnement physique circonscrit. La direction de l'engagement de l'être-au-monde, ou posture, est ce que Merleau-Ponty nomme l'intentionnalité. Cette intentionnalité nécessite par ailleurs la mobilisation d'un schéma corporel, c'est-à-dire un type de relation spécifique entre le corps et son environnement physique. Dans cette idée du schéma corporel, est comprise la notion d'habitus, définie comme ce qui permet de connecter des mouvements, des relations spatiales associés à une certaine intentionnalité, et de les rendre disponibles au corps. L'habitus est ce sur quoi repose la possibilité de l'action renouvelée. Cette conception de l'habitus nous permet de dépasser les limites du concept d'affordance dans le cadre des relations entre TIC et espace organisationnel. Nous proposons ainsi une nouvelle approche de l'espace organisationnel en prenant une perspective expérientielle. Nous suggérons de développer cette perspective dans la lignée des travaux sur de Yoo (2010) en informatique, et en approfondissant la notion de « embodiment » dans les SI.

## Résumé

Cette thèse questionne l'idée, aujourd'hui largement partagée, d'une compression de l'espace dû aux TIC. Ceci est dû au peu d'attention que les recherches en Systèmes d'Information ont porté à la question de l'espace organisationnel, ainsi qu'au déterminisme technologique. Cette étude cherche à comprendre la relation entre espace organisationnel et TIC en partant de la théorie de l'affordance, fondée sur les travaux de J.J. Gibson.

Une étude de cas multiple portant sur deux écoles de management, au Canada et en Angleterre, a été menée. Les pratiques spatiales des chercheurs ont été analysées à partir d'un modèle fondé sur la théorie de l'affordance, afin de vérifier le rôle des TIC dans la formation de ces pratiques. Les résultats montrent que cette approche théorique n'est en réalité pas pertinente pour l'étude des TIC de manière générale.

Nous proposons une perspective alternative reposant sur la phénoménologie de la perception de Merleau-Ponty. Au regard des 2 cas étudiés, cette approche suggère que les TIC ont un double effet : elles compriment et étendent l'espace simultanément. Les TIC constituent un point focal où les espaces proches et éloignés convergent pour produire une unique sphère d'expérience. Notre étude développe les concepts merleau-pontiens d'intentionnalité, de schéma corporel, d'habitus, de corps-connaissant et corps habituel dans le contexte des pratiques spatiales des chercheurs. Nous proposons d'abandonner la théorie de l'affordance au profit d'une approche expérientielle pour comprendre la relation entre espace organisationnel et TIC.

## Mots Clés

Espace organisationnel ; TIC ; pratique spatiale ; affordance ; habitus ; intentionnalité ; schéma corporel.

## Abstract

The dominant narrative of the collapsing of space due to ICT in organizations is challenged by this study. It is argued that this is due to a general lack of interest in organizational space in IS scholarship combined with technological determinism. This study seeks to understand the relationship between ICT and organizational space by mobilizing affordance theory based on J.J. Gibson's work. A qualitative multiple-case study covering two business schools, in Canada and the UK, was undertaken. The spatial practices of academics were scrutinized using a model based on affordance theory to ascertain the role of ICT, as part of the wider environment, in the shaping of these practices. The results clearly demonstrate the inadequacy of affordance theory for the study of ICT in general. An alternative perspective based on the phenomenology of perception of Merleau-Ponty is proposed and successfully tested against the data. This alternative perspective suggests that, based on the experience of academics, ICT simultaneously collapses and expands space. ICT acts as a point of singularity where proximate and remote spaces converge to produce a singular sphere of experience. The study further develops Merleau-Ponty's concepts of intentionality, body schema, habitus, knowing body, and habitual body in the context of the spatial practices of academics. I propose abandoning affordance theory in favour of an experiential approach to understand the relationship between organizational space and ICT.

## Keywords

Organizational space; ICT; spatial practice; affordance; habitus; intentionality; body schema.