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DESIGNING FOR MOBILE ACTIVITIES
WiFi Hotspots and Users in Quebec City

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Résumé

Les nouvelles technologies de l'information et de la communication (TIC) permettent de mener davantage d'activités en dehors des lieux de travail et de résidence. De plus en plus de commerces offrent un accès sans-fil gratuit à l'Internet (WiFi) en même temps que le nombre d'appareils mobiles capables de se brancher à l'Internet est en pleine croissance. L'individu qui recherche une connexion Internet gratuite dans la ville pour pratiquer des activités à distance a vraisemblablement l'embarras du choix. Tandis que de nombreuses études s'intéressent à l'impact des TIC sur des lieux comme des milieux sociaux, rares sont celles qui s'interrogent sur les qualités physiques de ces milieux. Les architectes et les urbanistes abordent rarement le WiFi comme un élément de design : la présence de ce dernier se limite souvent à un élément considéré anecdotique ou invasif. Ce projet de recherche, mené à Québec dans le cadre d'un mémoire de Maîtrise en sciences de l'architecture au sein du Groupe interdisciplinaire de recherche sur les banlieues (GIRBa), se penche sur les divers profils d'utilisation et d'appropriation du WiFi afin de réfléchir à celui-ci comme un élément important de design pour les lieux publics et semi-publics au 21e siècle. Pour ce faire, ce projet identifie les lieux et les secteurs les plus populaires pour l'utilisation du WiFi par l'analyse de la base de données de l'organisme à but non lucratif, ZAP Québec, qui gère le service WiFi des lieux publics et semi-publics à Québec depuis 2006. Ensuite, une enquête Internet menée auprès d'un échantillon de 63 utilisateurs WiFi à Québec suggère une diversité de profils d'usage de l'Internet sans-fil. En dernier lieu, une analyse spatiale inspirée du *Pattern Language* développé par Christopher Alexander dans les années 1970 a permis d'identifier des configurations spatiales récurrentes dans les lieux publics et semi-publics les plus fréquentés. Ce mémoire révèle que certaines tendances observées tant chez les usagers que les lieux les plus fréquentés peuvent servir à guider les stratégies d'implantation du WiFi et le design des lieux où son utilisation est prévue. Bien que ce mémoire demeure exploratoire et soulève beaucoup de questions, il porte un nouveau regard sur un phénomène qui mérite d'être l'objet de futures études. Des directions possibles pour ces dernières sont discutées en conclusion.

Abstract

New information and communication technologies (NICT) are transforming the way people conduct activities in spaces outside the home and office. With the spread of wireless Internet (WiFi) into public and semi-public places and the increasing number of mobile devices capable of accessing the Internet, the city is now full of places where activities can be conducted remotely. Studies looking at the impact by NICT frequently address its impact on the social ambiance of places, but rarely consider the physical nature of its use. Seldom is WiFi approached by architects and urban planners as a design element—or it is reduced to something seen as ancillary or even invasive. This study, which was carried out as part of a Masters of science in architecture thesis conducted in Quebec City at the Interdisciplinary Research Group on the Suburbs (GIRBa) at Université Laval, addresses this latter judgment critically by looking at WiFi use and users as sources of inspiration for designing urban places of gathering in the 21st century. Through the analysis of data from the central server of a local Quebec City non-profit WiFi provider, ZAP Québec, an Internet survey conducted among sixty-three WiFi users and a spatial analysis using Christopher Alexander's Pattern Language (1977), this Master's thesis shows that the geographic variations of WiFi use can aid in orienting the development of WiFi networks and the places where WiFi is to be used. A typology of users also sheds light on a certain set of individuals who use WiFi and their varying practices. While the exploratory nature of this study may raise more questions than it answers, its findings aid in proposing a variety of approaches to WiFi integration within the urban environment as well as several directions for future research.

Avant-propos

Ce mémoire n'aurait pas pu être possible sans le support incessant de plusieurs personnes et organismes auxquels je suis très reconnaissant. Je tiens à remercier en premier ma directrice, Carole Després, de m'avoir laissé beaucoup de liberté pour développer ce projet de recherche essentiellement exploratoire. Elle a été une source d'inspiration tout au long de mes études en sciences de l'architecture, sans laquelle je n'aurais pas décidé de compléter cette maîtrise de recherche, qui m'a permis d'acquérir de nouvelles connaissances en m'appuyant sur des compétences déjà acquises.

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À ceux qui ont dû se contenter de se parler virtuellement.
J'espère vous revoir bientôt

To those for whom electronic communication has had to suffice.
I hope to see you soon.

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1.0 Introduction

In 2006, the non-profit organization, ZAP Québec, opened its first wireless hotspot in Quebec City. By the end of 2008, when this research project was in its early stages, 130 wireless hotspots had opened around the city and ZAP Québec had about 12,000 users. As places that offer a free wireless connection to the internet (WiFi), these hotspots, called ZAPs[1], included not only typical locations for wireless Internet, such as cafés, restaurants, libraries and public parks, but also community centers, ice rinks and cinemas. As of August 2010, ZAP Québec offered WiFi in 209 places and had nearly 50,000 users.

The popularity of ZAP Québec is indicative of a general rising interest in wireless connectivity and mobile technology. Just as the cell phone offers the freedom to communicate wherever one desires, being able to access the Internet while on the go creates opportunities to engage in various activities that can take advantage of the myriad sources of information and communication opportunities provided by the Internet. Although the line between mobile telephony and wireless Internet is beginning to blur as 3G and 4G cellular services come on line and smart phones that offer Internet access like the iPhone, Blackberry and Android gain market share, wireless Internet is still primarily place-based, particularly in the Canadian province of Quebec[2].

The migration from fixed to mobile technologies over the course of the 1990s has been generally seen as a disconnecting of technology use from place, leading to what has been called the *Untethered City* (Townsend 2003). While the land-line telephone would have been associated with someone's home, office or a booth located on a city block, cell phones no longer connect places, but individuals (Wellman 2002). Internet access is undergoing the same transformation, as portable computers become more common and WiFi capability spreads to MP3 players and game consoles. Activities performed using information and communication technologies (ICT) can now be conducted anywhere the device can be comfortably used. The sight of laptops in cafés, for example, has become common place.

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[1] For 'Zone d'Accès Public' or 'Public Access Zone'

[2] Although more than half of Quebecers over the age of 18 (54,9% in 2009) have a cell phone, only 7,6% of adults use a cell phone to connect to the Internet in 2009 (CEFRIO 2010: 48-49) while this is 32% in the United States (Pew Internet & American Life Project 2009).

Although mobile devices are being marketed as having a panoply of functions applicable to both personal and professional uses, the workplace is typically where ICT are introduced and where new practices are incubated (Moati 2005). If mobile devices are contributing to the growing mobility of the work force, they are not the only factor. As the information economy eclipses the industrial economy, the temporal and spatial coordination championed by Taylorist management principles gives way to production modes that are de-territorialized and asynchronous (Sennet 2005). Capital necessary to conduct business in an economy run on the exchange of information and services is 'light' rather than 'heavy'—mobile rather than stationary (Bauman 2000). Businesses can be run through communication and information networks by geographically distant individuals from their portable computers (Benkler 2006). Face-to-face communication remains important, but on a new intercontinental scale. Even as business travel increases, daily communications are satisfied through ICT, granting individuals the freedom to choose where and when they perform work-related tasks (Amin & Thrift 2002; Graham & Marvin 1996).

These technological and economic changes are affecting the experience of everyday places. The home becomes a principal or occasional workplace, while some offices attempt to increasingly integrate the comforts of home (Pélegrin-Genel 2006). Park benches and cafés become places of work and play. Binary notions of public and private, personal and professional that were once confined to particular places are blurring and mobile (Sheller & Urry 2003). Places are increasingly both locally bound and globally connected (Castells 2007, orig. 2004).

These changes are not met without controversy. ICT have been blamed for a loss of interest in public spaces in the past (Meyrowitz 1985; Oldenburg 1989); although this may be due more to the historical emphasis on the domestication of technology use (Graham & Marvin 1996) than the technologies themselves. The presence of fixed ICT like the radio, television, desktop computer and land-line telephone made the home and office hubs for communicative activity and information consumption, to the detriment of 'third places[3]' like cafés, pubs and the like. The ability to bring ICT back into public places

[3] Whereas the home is considered the 'first place' and, the office, the 'second place', the 'third place' is "a generic designation for a great variety of public places that host the regular, voluntary, informal, and happily anticipated gatherings of individuals beyond the realms of home and work"

may reverse this trend, reactivating public spaces (Mitchell 2003). In fact, the most recent study from the Pew Internet and American Life Project (Hampton *et al*. 2009) found that Internet users were more likely to visit public and semi-public places than non-users, contrary to the prevailing belief that Internet use leads to domestic cocooning.

In this context, the proliferation of WiFi hotspots in Quebec City offers a growing number of places where numerous activities may coexist and overlap in the same space. Although the users and their devices are mobile, their WiFi connection is not.[4] In this way, wireless Internet use is still place-bound, bringing WiFi seekers into specific places. No place is created equal, however. Different hotspots may offer different qualities that make them more or less attractive. At a larger scale, the choice of where to locate an activity is related to the costs of moving that activity from one place to another and the level of interaction or adjacency that the principal activity requires with other activities (Mitchell 2007, orig. 2002). In other words, mobile technology and WiFi together decrease the cost of moving activities and enable necessary interactions to occur online, allowing the qualities of the places themselves to play a more important role[5]. Architect and technology theorist William Mitchell has called this "the revenge of place" (2007 p. 428).

This may have two important impacts on architecture and urban planning. First, the "traditional" qualities that make public and semi-public places[6] successful may change as these and other places take on new uses and roles. Multiple activities converge on such places and reassess their value as not only cafés or libraries but as temporary work or leisure places where individuals connect both locally and electronically to people and places.

(Oldenburg 1989: 16). Oldenburg reminds us that the distinction between first and second places dates from the Industrial Revolution, prior to which home and workplace were one and the same.

[4] At the time of writing, the price of data plans for mobile phones in Canada still favored the use of WiFi for serious mobile Internet use. In order to encourage nomadic users to 'alight' at one of their hotspots, ZAP Québec released a mobile application for the iPhone during the summer of 2010. iPhone users could use the application to locate the nearest ZAP and take advantage of the free wireless offered by the collaborating merchant.

[5] Richard Florida, author of *The Rise of the Creative Class* (2002) and *Cities and the Creative Class* (2005), underlines the importance of the qualities of place in framing cities as attractors of nomadic workers and industries. Instead of knowledge workers being entirely freed from the constraints of place, cities take on new functions as nodes of face-to-face networking, incubators for talent and places to experience a certain urban lifestyle in mixed-use neighborhoods.

[6] In the context of this thesis, a public place is understood as one which is funded publicly and to which access is not controlled. A semi-public place requires the purchasing of a good or service, such as a café selling coffee. It is okay to use WiFi in the park or in a library without purchasing anything. This is less acceptable at a café or in a restaurant.

Already there is evidence that WiFi hotspots are places that are frequented not only for the positive aspects they offer on their interior, but also for their location within the city and their proximity to other services (Forlano, 2008). This could modify individual patterns of daily mobility. When work can be conducted 'anywhere', the choice of 'where' may become subjugated to a series of more pressing constraints, such as proximity to the home, to a client or to children's activities, or simply to the positive ambiance of a particular neighborhood. Design responses to this condition occur at both architectural and urban planning scales.

This Master's thesis departed with the assumption that the "revenge of place" (Mitchell 2007, orig. 2002) would become apparent in the pattern of WiFi hotspot usage in Quebec City. Understanding what environmental factors characterize the most frequented hotspots provides clues as to the nature of WiFi use and the means to produce future successful public and semi-public places looking to be both locally embedded and globally connected. In Quebec City, as in other cities, WiFi is being publicly funded and used as a marketing element to improve the attractiveness of certain parts of the city (Therrien 2009)[7], necessitating an understanding of the actual WiFi users and the recurring qualities of the places where they use wireless Internet the most. This research project attempts to show that hotspot popularity can be approached as a design issue, at multiple scales.

This project is exploratory and raises as many questions as it answers. The mainstream use of wireless Internet in public and semi-public places is still relatively recent at the time of writing, but will only become more prevalent, as technologies become more powerful and accessible to a larger portion of the population. The emerging spatial practices implicating technologies, people and the built environment merit an investigation.

There is already a growing body of research looking at the impact of ICT on spatial practices and this thesis will begin by reviewing the most recent studies, showing that mobile technologies are implicated in a variety of emerging trends concerning individual mobility and the experience of place. The literature review resulted in a variety of research questions that will be discussed in Chapter 3. Chapter 4 will present the results of the

[7] ZAP Québec has been primarily funded by the local city government (Therrien 2009). In the 2008 elections, the Liberal Party (in power as of August 2010) made it a point to include the development of free wireless Internet access around the city in their political platform (Élections Québec 2008).

study of WiFi hotspots and users and Chapter 5 will discuss hotspot design implications and directions for further research.

2.0 Mobile people, devices and activities

Information and communication technologies (ICT) and transport networks provide the means for individuals to overcome the friction of distance (Janelle 1973). The influence, notably of telecommunications, on the human relationship to space and time has inspired numerous studies in geography, transportation studies, communication science and sociology, to name only a few disciplines. Three currents of discourse developed at the end of the twentieth century: one predicting the substitution of geographic movement by ICT, another looking at a parallel evolution of physical and virtual space, and the third, inspired by actor-network theory, considering the subtle relationships between human actors and non-human technological artifacts (Graham 1998).

As opposed to the latter two, the first current took on a particularly deterministic position, going so far as to announce the "death of distance" (Schwanen & Kwan 2008) due to new communication technologies. What several literature reviews have shown however is that ICT are actually creating new space-time geographies (Graham 1998; Kwan 2002; Schwanen & Kwan 2008). Observing the parallel increase in travel and in the adoption of ICT such as the Internet and the mobile phone, Mokhtarian (2002) concluded that physical travel and virtual communication are complements rather than substitutes.

The "spatial technologies" of ICT and transport networks (Couclelis 1994, p. 142) must therefore be considered jointly in order to "explore the new geography they generate together as an interdependent whole" (p. 143). Both physical and virtual, we inhabit these geographies differently and move differently through them. In response to this duality, sociologists Mimi Sheller and John Urry (2006) propose a 'New Mobilities Paradigm' that seeks to apprehend the ways in which individual mobility is constructed through networks of physical transport systems and communication technologies.

Recent research has concentrated on this relationship between geographic movement and ICT use. The literature reviewed here was collected in an attempt to evolve several general questions posed by the research project: How is ICT use related to changes in travel and activity behavior? How are new technologies used to inhabit space and time differently? Who are the new pioneers of mobility and how do they negotiate space-time constraints? These questions assembled a body of work separable in terms of

scale. The review begins at the geographic level by looking at empirical research on the relationships between ICT use, travel and activity behavior. Then it looks at how space takes on new meanings as technologies enable individuals to travel, work and wait in new ways. Finally, studies are presented that elucidate the ways that individuals—workers in particular—integrate technology and transportation modes into their strategies to overcome space-time constraints. The review concludes by raising several questions that this research project seeks to address.

2.1 ICT use and travel

How is ICT use related to changes in travel and activity behavior? Empirical studies attempt typically to respond to this question by focusing on a particular technology, like the cell phone, wireless (WiFi) or fixed Internet and the laptop computer. Sociologist Licoppe and his colleagues (2008), for instance, investigated the parallels between communication by cell phone and local geographic travel. By installing software on the mobile phones of 24 Parisians, the team was able to track the movement of participants over a period of six months using cell tower triangulation. This extensive digital travel diary was then supplemented with the call record of the individual and an interview in order to develop a profile that went beyond communicational practices. Despite differing degrees of cell phone use and travel, the team found that mobile phone use coincided frequently with participants' moments of movement or waiting. Furthermore, the more calls participants made during the study period, the greater the number of trips was, suggesting a relationship between the degree of mobile communication use and the degree of physical travel.

The first wave of a panel study conducted in Quebec City from 2002 to 2005 suggested a similar link between geographic movement and cell phone use. Through an analysis of 334 seven-day activity diaries, geographer Lee-Gosselin and civil engineer Miranda-Moreno (2009) found that individuals with cellular phones engage in significantly more out-of-home activities than those not possessing such a device, after controlling for the influence of major socio-demographic variables. The activity diaries also revealed that individuals with access to a cell phone typically had a greater number of daily trips than those without.

Geographers Thulin and Vilhelmson (2007) remarked the same parallel trend between communication practices and activity-travel behavior, this time focusing specifically on Swedish youth. What could be concluded from the activity diaries and in-depth interviews was a tendency for the participants with cell phones to engage in more face-to-face interaction and a greater number of daily trips than those without. Similar to Licoppe and colleagues (2008), Thulin and Vilhelmson (2007) draw a comparison between the number of social contacts and the amount of cell phone use and travel. These three studies indicate that, in general, cell phone use can be associated with a greater propensity to get out of the home and to travel, a tendency which is partially influenced by the social networks of the participants.

Two additional studies looked at cell phone use and the structuring of activities. Inspired by the concept of activity fragmentation put forth by Couclelis (2000)[8], transport researchers Lenz and Nobis (2007) used a subsection of a national survey administered in Germany. The survey, supplemented by a one-day activity diary, collected a variety of information related to work activities, travel and Internet, cell phone and laptop use. The study focused on work activities, assuming that these were the most likely to be fragmented. The cluster analysis revealed a group of *mobile phone fragmenters* (264/1612) and *mobile computer fragmenters* (62/1612), which is about one in five workers, for whom the degree of activity fragmentation[9] surpassed that of the other groups (Lenz & Nobis 2007). These workers had a higher number of working hours, a greater usage of the automobile, a higher usage of cell phones and laptops as well as a greater number of business-related daily trips. The authors avoid making the claim that ICT use causes fragmentation, but propose that the conditions that make the daily lives of these workers complex induce a demand for ICT use.

Like Lenz and Nobis (2007), civil engineers Srinivasan and Raghavender (2006) examined the cell phone as a tool for managing complexity in the daily trips of

[8] An activity becomes fragmented when it can be conducted gradually over a variety of different spaces and over a flexible period of time. While activity fragmentation is not unique to the Information Age, ICT allow a greater diversity of activities to be fragmented over a larger number of different spaces (Couclelis 2000).

[9] Meaning the number of different places and periods of time in which the same activity is conducted. For example, carrying out a work-related task at the office, in a café, in public transport and at the kitchen table or in a home office.

professionals. They interviewed working members of 408 households[10] in the Indian city of Chennai in order to understand how cell phone use affected travel patterns. Their study revealed a greater frequency of unplanned trip chains[11] among those with cell phones than those without. The real-time coordination permitted by spontaneous communication facilitated the creation and modification of activities while on the move. A higher number of work-related meetings were also positively correlated with the propensity to chain activities.

The studies reviewed above associate the mobile phone with a greater number of daily trips, face-to-face and out-of-home activities, social contacts as well as activity fragmentation and trip chaining. It is a device that, until the recent appearance of smart phones, was used principally to contact other people. Studies therefore have treated Internet access separately and typically associate it with fixed-location use. The study by Lee-Gosselin and Mirando-Moreno (2009) for instance finds that individuals with Internet access in the home engage in fewer out-of-home activities, although the authors admit the shortcomings of knowing neither the extent of the Internet use nor the degree to which use occurs outside the home.

Geographers Wang and Law (2007) used data from the Third Travel Characteristic Survey of Hong Kong (n=4935) to investigate how the use of Internet, email, videophone and video conferencing compares with travel behavior. While their study finds a positive and significant correlation between the aggregate use of these devices and the overall number of trips (2007), it does not investigate the activities performed nor the places where these technologies are used.

Urban planner Zhang and his colleagues (2007) looked at the frequency of Internet usage in both the home and at work using data from the National Household Travel Survey Add On for the metropolitan area of Baltimore. The telephone survey (n=5429) collected information concerning individual and household characteristics, Internet and cell phone usage and the trips made over the course of one day. While the regression models were inconclusive for cell phone usage, they showed that a high frequency of Internet usage at the home and office was positively correlated with the number of vehicle miles traveled.

[10] Of which 355 were retained (Srinivasan & Raghavender 2006).
[11] Trip chains are a series of trips that are made in succession without returning to the origin, like running a series of errands without returning to the home after each.

Therefore, Internet usage seems to induce a greater number of trips and distance traveled, but the nature of the usage is not always clear as shown by Lee-Gosselin and Miranda-Moreno (2009) who find a contrary effect associated with Internet access at home.

The following two studies focus specifically on the spatial-temporal characteristics of workers and its relationship to travel behavior. Civil engineers Srinivasan and Athuru (2004) use activity-diary data from the San Francisco Bay Area Travel Survey of 2000 (n=2381) to suggest that work hours are influential in Internet use and travel behavior. For instance, individuals with flexible work times exhibited a "greater propensity for out-of-home maintenance [banking, etc.] activities than did those with fixed work times" (2004, p. 239), showing that the substitution of work activities with ICT use created time for other types of out-of-home activities. Furthermore, these same workers made longer and more frequent trips than workers with fixed work hours.

Transport researchers Hjorthol and Gripsrud (2009) also found that work habits are important variables when considering Internet use and travel behavior. Their study looked at how the home is becoming a hub for ICT use, particularly among those for whom the home is permeated by ICT-enabled work activities. Relying on a subsection of data targeting Internet users from the Norwegian Passenger Travel Survey of 2005 (n=2768), their study reveals that working occasionally at home using the Internet does not decrease the number of daily trips, but did not necessarily increase them either, contrary to what Srinivasan and Athuru (2004) found.

Unlike the cell phone, the Internet is not a device and its usage could as much occur on the home computer as on a work computer, Blackberry, mobile phone or even on a terminal in an Internet café. The Internet is an infrastructure and a multiplicity of means exist by which to access its wealth of information, necessitating a study that looks at usage across several devices. Three studies look at the usage of Wireless Internet networks. While they do not seek any sort of difference between users and non-users, their results reveal certain daily patterns of Internet use across different devices.

An early study by computer scientists Tang and Baker (2002) used data collected in 1998 by the main server of the Metricom network, which managed the municipal wireless network of the San Francisco Bay Area at the time. The data contained the

identification number of each device used and the different pole tops[12] accessed to connect to the network as well as the history of network activity for each device, resulting in an estimation of the level of use of each device as well as its geographic movement about the network. The amount of device movement was not extensive, but did coincide with commute times, meaning for instance that a laptop was moved from the home to the workplace. Usage, on the other hand, peaked in mid-morning, in the middle of the afternoon and later in the evening, decreasing frequently around commute and meal times.

Afanasyev and his colleagues (2008), also computer scientists, performed the same type of study a decade later using the wireless network of the California town of Mountain View. Their results differ slightly from Tang and Baker's (2002), principally due to the data's containing smart phones[13] (2008). Whereas laptop use preceded and followed commute and lunch times in 1998 (Tang & Baker, 2002), Internet activity using smart phones increased in this period in 2008 and most notably during commute times (Afanasyev *et al.* 2008). The results from these two studies suggest that the places where Internet access occurs depends on the device. Laptop use would be logically less practical during commute periods and while dining, while a smaller device, like a mobile phone, is easier to manage. Similar to the case of using the mobile phone to make calls (Licoppe *et al.* 2008), Internet browsing on smart phones occurs during in-between moments of travel and waiting. Differences in ICT use are therefore informed by the ergonomics of the devices themselves, which may be smaller and more light weight. In addition, location-based services (LBS) have greater utility then delivered to very portable devices.

Information and communication technologies (ICT) are clearly enrolled in new spatial and temporal practices. The studies reviewed in this section have shown that the cell phone permits new communicative behavior while on the go and suggest a possible association of mobile phone use with a greater number of daily trips and out of home activities. Studies of Internet usage provide results that are slightly less conclusive. As the studies of wireless networks show, differences in the ways the Internet is used depend

[12] The Metricom network was designed to distribute wireless evenly across the city by spacing wireless access nodes on pole tops (see Tang & Baker 2002, p. 111 for a map of the pole distribution in the San Francisco Bay Area).

[13] Mobile phones able to access the Internet, such as RIM's Blackberry and Apple's iPhone were not observed in the 1998 study by Tang & Baker (2002).

on the device with which one connects. But what of the places where these connections occur? The next section, in addition to considering the capacities of the devices and the aptitudes of the users themselves, looks at the role of spatial characteristics in ICT use.

2.2 Place as a container for fragmented activities

The *New Mobilities Paradigm* (Sheller & Urry 2006) proposes a re-conceptualization of the notion of place. Rather than being fixed, places are "implicated within complex networks by which hosts, guests, buildings, objects and machines are contingently brought together to produce certain performances in certain places at certain times" (p. 214). Places become linked through the individuals that traverse them and the activities enacted within them. This section reviews recent studies in order to understand the role of place in new mobilities and how ICT allow spaces to become containers for coincident activities, both in public and semi-public places and during travel and wait times.

With the growing number of places that offer wireless Internet access, individuals have a variety of opportunities to use the Internet outside the home. In her dissertation, communications major Laura Forlano (2008) began by examining the user activity of the NYC Wireless network and noticed that usage patterns fluctuated by hour, day of the week and season. She then administered an Internet survey to wireless Internet users in New York City (n=614), Montreal (n=370) and Budapest (n=378) to discover that users typically went to wireless hotspots to get out of their home or office and performed both personal and work-related activities, like reading and writing emails or chatting online. Her study also found that most users stay on average between thirty minutes and two hours, explaining that some people stop to get information on their way somewhere or choose to kill time between time-fixed commitments. Forlano (2008) then interviewed 29 WiFi users. The discourse of the participants revealed that a variety of factors, including the ambiance of the space, the services offered within the hotspot as well as adjacent to it (such as print and copy services) were considered when choosing which hotspot to visit. She also noted, interestingly, that nearly a quarter of the hotspot users were freelance workers, independent contractors and entrepreneurs, a group that, in the United States, "represents a growing part of the workforce" (2008, p. 149).

Certain types of workers travel frequently and attempt to carry out work activities in a variety of places. A study of 34 business travelers (n=17) and mobile workers (n=17) in

the United Kingdom by computer scientists Brown and O'Hara (2003) examined how spaces encountered while on the move impact the types of activities that can be performed. The interviews revealed for instance that the workers' tasks performed on mobile devices were limited by the capacities of the space in which they found themselves. Due to a lack of room or lack of proper seating, the mobile workers adjusted their tasks in order to make use of what was available. Spatial sequences also came into play. Being able to charge a laptop before boarding a plane assures that one will have the power necessary to not only work while waiting, but to continue working on the laptop computer once in flight[14]. The spatial mobility of the workers interviewed by Brown and O'Hara (2003) changed the role of the traditional office in these workers' temporal and spatial sequences. The work place became a location that guaranteed physical co-presence with colleagues. The authors liken the role of the office for these workers to a local pub or café. In this way, the people encountered in the spaces are also important.

Work psychology and knowledge management specialists Hislop and Axtell (2009) interviewed multi-location workers from two different companies (n=18) in the United Kingdom. Similar to Brown and O'Hara (2003), they find that the office is a valuable place to work with colleagues but that the home becomes an important place to concentrate on work tasks without distraction. The car is a location for making business-related or personal calls, whereas social norms requires that mobile devices be turned off at client locations.

Space is still something to which the individual responds affectively, which also influences the ways that ICT are used to inhabit spaces differently. Through interviews with mobile workers in Tokyo (n=6), London (n=12) and Los Angeles (n=8), cultural anthropologist Ito and her colleagues (2009) identified two strategies for using ICT to connect or disconnect from the immediate surroundings: cocooning and camping. *Cocooning* is a strategy used in places to which one feels little or no affinity, such as the use of headphones by passengers traveling on public transport. *Camping* occurs when mobile devices are used by individuals to inhabit spaces, such as the café, where the ambiance creates a convivial environment to which workers feel a certain level of attachment. The café, as Laura Forlano (2008) would concur, is the campsite par

[14] Certain companies now offer in-flight power sources for a variety of devices, although this is not standard across all airlines nor in all cabin types. Some long-distance trains and buses also provide AC power outlets.

excellence. According to Ito and colleagues (2009), *camping* also comprises certain degrees of *cocooning*, considering that the worker may indeed need to accomplish a task and a crying baby or loud espresso machine may need to be blocked out temporally. This type of individual would, in the context of Gupta's (2004) study of socialization practices in wireless cafés, be a *true mobile*. Through participant observation, an online survey and face-to-face and email interviews with wireless café users in Seattle and Boston, the comparative media studies major found that these individuals were either *true mobiles* or *socializers.* Whereas for *true mobiles* the wireless café becomes a background for a principal activity, *socializers* camp out with laptops in wireless cafés in the hope of connecting with physically co-present others. Her study considers more than just workers, but emphasizes as previous studies have (Brown & O'Hara 2003; Forlano 2008; Hislop & Axtell 2009) the important role played by co-present others when using ICT in public and semi-public spaces.

Information and communication technologies also allow individuals to integrate spaces differently into their daily mobility. Public and semi-public spaces take on new meanings as activities performed in them diversify. Just as different activities can be carried out across various places, the number that can be conducted simultaneously also increases. Transport researchers Kenyon and Lyons (2007) investigated how multitasking using ICT changes the understanding of the amount of time spent on certain activities. Using 86 activity diaries where individuals recorded not only their principal activity but also simultaneous activities, they found that taking into account coincident activities increased the time spent communicating using ICT by six. Furthermore, the study revealed a link between the amount of time spent multitasking and the time spent traveling, suggesting that multitasking while traveling might influence travel mode use. This possibility to redefine the notion of travel time has generated an interest in how ICT use enables time spent in transit to be used productively. Studies in this section have shown how workers use mobile technology to conduct work-related tasks as they move through a variety of spaces. The following empirical studies investigate how travel and wait times are appropriated through ICT use.

Transport researcher Lyons and his colleagues (2007) analyzed results of a mail-back questionnaire to a large number (n=26211) of passengers on several British train lines in 2004. They were interested primarily in how travel time is spent, its perceived

utility and the factors supporting its appropriation. While ICT seemed prevalent only among youth and business travelers, the number of activities performed varied according to the time spent traveling. A study in Japan by transport researchers Ohmori and Harata (2008) also found that trip time was important, as well as the type of train and whether or not the person was able to stand or sit. The researchers distributed a questionnaire on three different types of commuter trains during the morning and evening rush hours in Tokyo. The results revealed for instance that web browsing on a mobile phone was performed more often by standing passengers who were more likely than seated passengers to engage in activities on a personal digital assistant (PDA), again underlying the role that spatial constraints play on the potential to perform activities. They also found that the passengers most likely to use ICT on the trains were workers and, notably, workers with flexible working hours. This finding harkens back to two studies showing that flexible work times can be associated with greater ICT use both in the home (Hjorthol & Gripsrud 2009) and on the go (Srinivasan & Athuru 2004). In another study of train travel, work psychologist and knowledge management expert Axtell and her colleagues (2008) specifically take into account the activities performed by mobile workers. They found, similar to Brown and O'Hara (2003), that the train environment provides a number of constraints to which mobile workers have to adapt their practices. Signal quality was not always consistent, thereby reducing activities to offline tasks. The length of the journey was important in deciding whether or not it was worth attempting to work at all (Axtell *et al.*, 2008).

Geographic movement is not always accomplished by train and certainly less so in the highly automobile-centric context of North America. Although no studies of travel time use in North America are known by the author, the study performed in the United Kingdom by Hislop and Axtell (2009) found that the car was an important place encountered by mobile workers on a daily basis and that the mobile phone was used to catch up with coworkers, friends and family, showing the versatility of the automobile as a private space on the move. The car, according to Ito and colleagues (2009) is, in fact, a cocoon within which the mobile workers in Los Angeles navigate the public space of urban infrastructure. It is therefore a unique condition and one that cannot be neglected. Geographer Eric Laurier (2004, 2002) performed an exploratory study in Great Britain investigating the automobile as a mobile office for six service sector workers. He gives an example of one

of these mobile worker whom he followed for one day, examining how she managed working while driving. The mobile phone kept her in touch with the main office as she drove to visit a variety of clients. Paperwork was organized so that it was easily accessible. Her routes were known to her and she was able to capitalize on traffic jams and long red lights to accomplish a certain number of tasks in the midst of her tightly scheduled day. The cognitive requirements for driving are undoubtedly such that fewer activities can be performed while still maintaining control of the vehicle[15].

Travel time on trains and, to a lesser extent, in cars can be spent engaging in various activities. While mobile devices allow periods of movement to be re-appropriated, travel is not always uninterrupted. Transport researchers Ohmori and his colleagues (2006) looked at how waiting, particularly when meeting up with others, is being transformed by mobile device use. Their study considers young adults, another important group of ICT users as shown in the study by Lyons and colleagues (2007). Interviews were performed with 87 pairs who had chosen the Shinjuku train station in Tokyo as their meet-up location. Whereas rendezvousing was traditionally dependent on people arriving at the same location at a predetermined time, cell phone use allows en route coordination and relaxes punctuality. Able to be reached by the arriving party via the mobile phone, the first person to arrive typically wandered away from the meet-up location and engaged in other activities. The study also found that the participants who had previously used the train station as a meet-up spot chose it due to the variety of adjacent activities that could be done while waiting.

As these studies show, places such as airplanes, trains and cars play an integral role in how activities are fragmented and overlapped in both time and space through ICT use. The constant evolution of mobile technology means that usage patterns are also in flux, as the ubiquity of communication networks and portability of devices lead to unpredictable uses. Technology use remains generally an individual act, each person articulating technological artifacts to meet his or her daily needs. The following section investigates how different practices, notably in the context of work, lead to individualized strategies for managing the complexity of everyday life through spatial technologies.

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[15] The workers followed were not using a hands-free device. While one of the workers scolds herself for using her mobile phone while driving, the article does not mention whether or not such practices were regulated in Great Britain at the time of the study.

2.3 Work, spatial technologies and mobility strategies

Among whom are these new practices so apparent? Is there a recurring profile? A review of the literature already discussed above suggests a dominance of young, highly educated male workers (Forlano 2008; Lenz & Nobis 2007; Lyons *et al.* 2007; Wang & Law 2007) although, for the time being, they constitute only a small proportion of the samples studied[16]. They are typically consultants, entrepreneurs or freelance workers who use technology to extend the geographic reach of the services they offer and the resources they access. According to Manuel Castells (2000), this type of worker is a byproduct of the Information Age, where enterprises, small and large, are implicated within global networks, deterritorializing their services. The rise of the Information Age worker "does not imply the end of the office, but the diversification of working sites for a larger fraction of the population, and particularly for its most dynamic, professional segment" (Castells 2000, 426). This growing trend implies changes in physical and virtual mobility practices. By looking at three studies of technology use by mobile workers, this section will help understand how information and communication technologies (ICT) orient the spatial practices of mobile workers.

In France, sociologist Boboc and her colleagues (2007) launched a study in an effort to understand how ICT are enabling work practices to become spatially independent. They were particularly interested in how professionals simultaneously use the telephone, the mobile phone and email in order to divide work between the home, periods of movement and a fixed place such as an office or a factory. Their telephone interviews (n=1074) enabled the team to develop a typology of workers: *Sedentary workers* (51%), *teleworkers* (8%), *home-workers* (4%), *mobile home-workers* (4%), *untethereds* (9%), *travelers* (15%) and *mixeds* (6%)[17]. While the majority of the participants were more traditional *sedentary workers*[18], three types stood out as representing the emerging groups of ICT users: *travelers, mixeds* and *mobile home workers*. *Travelers* are mostly male workers in the service sector; *mixeds* are mostly older males (50-64) who represent managerial staff in knowledge-based companies; *mobile home-workers* are those for whom work locations are split between the home and a variety of other places and who are

[16] 62 out of 1612 participants in Germany (Lenz & Nobis, 2007).
[17] *Les sédentaires, les télétravailleurs, les domicilaires, les domicilaires mobiles, les sans lieu fixe, les voyageurs,* and *les mixtes* (Boboc *et al.* 2007, translated by the author).
[18] Those who had one fixed work location (Boboc *et al*, 2007).

mostly male and mostly independent workers in the building and service sectors. For comparison, women showed up as the majority in both the *teleworker* and *home-worker* category; they are also under-represented in the *untethereds* group, comprised mostly of workers in the transport sector. The *mobile home-workers* turned out to contain the highest ICT users among those interviewed, surpassing the other groups in terms of mobile phone use for both personal and professional use, in their possession of a dedicated fixed telephone work line at home as well as an Internet connection in the home used for professional purposes. The researchers concluded that new strategies will evolve out of the necessity to balance the personal and professional spheres, as ICT use will not only bring work practices into the home but into a plurality of other spaces as well.

These new strategies require that the concept of mobility be re-conceptualized. In an effort to rethink mobility, information systems specialist Kakihara (2003) investigated the ways that the mobility of mobile workers could be understood beyond the simple definition of geographic movement. Referring to in-depth interviews with 62 mobile professionals in Tokyo, he concluded that mobile work practices could be divided into three types of mobility that comprise what he defines as the "hypermobility" of the individual (2003, p. 238): locational, operational and interactional mobility. *Locational* mobility implies geographic independence, a task or transaction that can occur in varying places through ICT use. *Operational* mobility results principally from the amount of dependency that a task has on physical equipment. For instance, a computer graphic designer for whom computer equipment is required to produce high-quality graphic images will be highly immobile, despite the potential locational independence created by the interaction with clients over the Internet. *Interactional* mobility implies a level of physical co-presence required by a given task, as best illustrated by an entrepreneur whose business partners are located in different parts of the world. Where face-to-face contact is required occasionally, ICT use suffices to communicate on a daily or weekly basis.

Sociologists Kesselring and Vogl (2008) interviewed a particular group of mobile professionals in Germany in an effort to understand how space-time constraints are managed through geographic travel and ICT use. Like Kakihara (2003), their conception of mobility extends beyond geographic movement to understand the capacity that individuals have to "drive" their lives and their responses to complexity, which they define as *motility*—a concept coined by urban sociologist Vincent Kaufmann (2002) and to which

they integrate ICT use. Their 45 interviews identified three types of "mobility management" (Kesselring & Vogl 2008, p. 170) that couple physical and virtual mobility in different ways: centered mobility management, de-centered mobility management and virtual mobility management. *Centered mobility management* is best illustrated by individuals whose lives are geographically concentrated. Professional and social networks are harnessed as a means by which to realize local projects, but without the extensive use of Internet or email. They travel infrequently but are able to manage a large number of daily work-related trips using public transport and exploit travel and wait times as "creative phases of professional activity" (p. 171). The second typology is defined as *de-centered mobility management* (Kesselring & Vogl 2008). While centered mobility pivots about a single geographic location, the de-centered typology couples ICT use and modes of transport in an effort to cope with a "multiplex network of places, people, ideas and cultures" (p. 172). Electronic communication provides a viable alternative to physical co-presence for an individual who is constantly on the go. Individuals with multiple regular places of work or residence in different parts of the world fall into this category. The third typology, *virtual mobility management*, removes physical travel from the mobility strategy altogether. This typology gains control of a physical immobility, whether chosen or imposed, through an extensive use of information and communication technologies. In the case study example, one participant provides her services to companies supplying niche markets located in geographically dispersed areas to which she is never required to travel. Transport networks and ICT are combined to overcome spatial and temporal constraints. Whether in an effort to preserve a sedentary lifestyle or juggle multiple groups of geographically dispersed friends, family and professional contacts, mobile device and transport mode choices are made out of necessity.

The three studies presented here and in particular the latter two, hint at the aspects of mobility extending beyond geographic movement that the *New Mobilities Paradigm* seeks to apprehend (Sheller & Urry 2006). This coupling of ICT use and transportation systems—the spatial technologies (Couclelis 1994)—develops a new complementarity between telecommunications and travel. ICT use and transportation infrastructure are not merely producing new ways of traveling; they are enabling new strategies to cope with the complexity of daily life and make use of everyday places. The following section concludes the literature review by posing questions about the role of place in emerging mobilities.

2.4 ICT, activities and mobility: place as a neglected actor

The three sections of this literature review present the results from the most recent research on the relationship between information and communication technologies (ICT) and activity and travel (summarized in Table 1). At times, ICT seem to be associated with an increase in mobility; at others, they appear to enable new forms of immobility. What is clear is that means of communicating and accessing information are being overlaid and integrated into everyday life in novel ways. The singularities of places, mobile devices and unique individuals interact in myriad ways without leading to a one-size-fits-all scenario. Despite fears of its loss of preeminence, the built environment's role is not a passive one. As the studies reviewed here suggest, places will be used and experienced differently through ICT.

Table 1. Summary of findings from the reviewed literature.

Principal findings	**Studies**
ICT use and travel	
Cell phone use correlated with greater number of out-of-home activities	Lee-Gosselin & Miranda-Moreno (2009) Thulin & Vilhelmson (2007)
Internet access correlated with a lower number of out-of-home activities	Lee-Gosselin & Miranda-Moreno (2009)
Cell phone use correlated with greater tendency to engage in unplanned trip chaining	Srinivasan & Raghavender (2006)
Cell phone use correlated with higher number of social contacts	Licoppe *et al.* (2008) Thulin & Vilhelmson (2007)
Cell phone use correlated with higher number of daily trips	Thulin & Vilhelmson (2007)
Possession of Internet, email videophone and video-conference use correlated with higher number of daily trips	Wang & Law (2007)
Internet use correlated with higher number of vehicle miles traveled	Srinivasan & Athuru (2004) Zhang *et al.* (2007)
Cell phone and smart phone Internet use higher DURING commute times	Afanasyev *et al.* (2008) Licoppe *et al.* (2008)
Laptop Internet use higher OUTSIDE of commute times	Afanasyev *et al.* (2008) Tang & Baker (2002)
Cell phone and laptop use correlated with higher tendency to conduct activities in various places and times, higher number of working hours and greater tendency to travel by car.	Lenz & Nobis (2007)
ICT users are mostly young, highly educated male workers.	Forlano (2008) Lenz & Nobis (2007) Lyons *et al.* (2007) Wang & Law (2007)
Place as a container for fragmented activities	
WiFi is used to get out of the home or office	Forlano (2008) Gupta (2004)
WiFi hotspots are chosen based on their environmental qualities, services and proximity to other services.	Forlano (2008)
Mobile device use is dependent upon the characteristics of the device and the place where use is attempted.	Axtell *et al.* (2009) Brown & O'Hara (2003)

For mobile workers, the office is a place for face-to-face communication with colleagues	Brown & O'Hara (2003) Hislop & Axtell (2009)
For mobile workers, the home is a place to concentrate on work.	Hislop & Axtell (2009)
For mobile workers, the car is a place to catch-up with colleagues.	Brown & O'Hara (2003) Hislop & Axtell (2009) Lyons *et al.* (2007)
The number of different activities performed while traveling increases as travel time increases.	Hislop & Axtell (2009) Lyons *et al.* (2007)
ICT use on trains is more prevalent among younger and business travelers.	Lyons *et al.* (2007)
ICT use on trains is more prevalent among workers with flexible work hours	Ohmori *et al.* (2006)
Work, spatial technologies and mobility strategies	
Work mobility can be understood by looking at how it is divided between an establishment, the home and traveling for business.	Boboc *et al.* (2007)
Work mobility depends on the equipment required, the involvement of physically co-present others and the need to be in a particular place.	Kakihara (2003)
Transportation and ICT are integrated into strategies to manage highly mobile to highly immobile relationships to territory.	Kesselring & Vogl (2008)

Considering the importance of the physical environment, the absence of a contribution by architects to this field of research is curious. Architects design places according to social and technical presumptions that could be put into question by the expectations of increasingly mobile individuals who are not required to be in a specific place at a specific time in order to access services, goods or other people. The studies reviewed here for instance often discuss the transformation of the office as a place where workers are not necessarily required to go to be productive employees. Other examples include banks and even grocery stores. When financial services can be reached online and fresh vegetables can be ordered over the Internet and delivered to the front door, banks and grocery stores either disappear or redefine themselves. Architects have the ability to react to such changes and develop creative solutions in response to them.

Rethinking how places are conceived to respond to emerging experiences of space and time through technology use requires a better understanding of the individuals who would benefit from such changes and the places in which mediated activities occur. Are ICT really only being used by young, highly educated males as several studies (Forlano 2008; Lee-Gosselin & Miranda-Moreno 2009; Lenz & Nobis 2007; Lyons *et al.* 2007; Wang & Law 2007) from this review suggest? Will such groups remain marginal? Will their practices transform how places are used and experienced? Architects have an important role to play in bridging the gap between new technological practices and the physical places in which these practices occur.

3.0 Investigating WiFi use in Quebec City

This research project is inspired by a theoretical assumption presented by Sheller and Urry (2006) as part of a *New Mobilities Paradigm*—that individual mobility incorporates movement in both geographic and electronic spaces. Contrary to the hypothesis that physical mobility and telecommunications are substitutes, the two in fact prove to be complementary, with the frequency of travel rising at a similar rate to the growth of information and communication technology (ICT) use (Mokhtarian 2002). As evidenced by the research reviewed (Chapter 2), combining ICT and transportation can transform both where and when activities are practiced and the places in which they are conducted. This research project attempts to explore how spaces—public and semi-public places in particular—are becoming places where multiple mobile activities converge.

Inspired by actor-network theory, this project approaches the transformation of place as the result of the interaction between human actors, technological artifacts (ICT) and transport systems (Law 1992). This relationship is multidirectional (Figure 1) and encompasses both the capabilities of the human actors and the non-human objects. The former can be understood as the aptitudes for physical or virtual movement, presented earlier as Kaufmann's (2002) notion of *motility* (Kesselring & Vogl 2008). The capabilities of the non-human objects such as information and communication technologies and transportation can be understood as *affordances*, a concept put forth by J. J. Gibson in the 1970s. The notion of *affordances* will be used in investigating the physical characteristics of the public and semi-public places where ICT are used, as the environment itself provides the conditions for a particular activity to happen (Greeno 1994). *Affordance* in this sense is used to refer to the fact that device battery length or the reach of WiFi and transport networks are not alone in bringing ICT use into public and semi-public places. The ambiance of the spaces themselves may play a role.

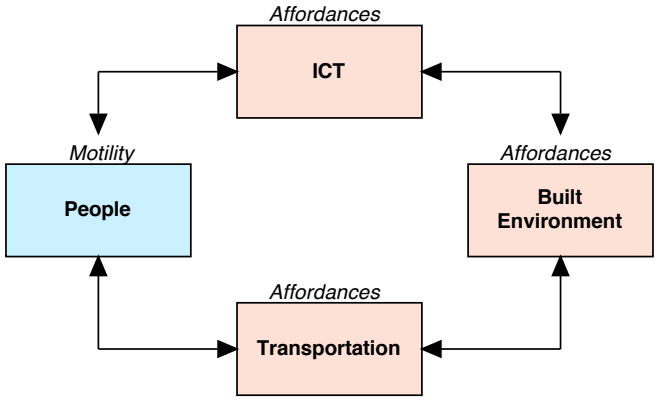

Figure 1. ICT and transportation as mediators between people and the environment

The phenomenon to be investigated involves human actors whose own mobility potential or *motility* combines with the *affordances* of ICT, transport modes and the built environment to create physical and virtual mobilities that are unique on an individual level. More specifically, the project looks at how WiFi users take advantage of the availability of free wireless Internet around Quebec City, responding to constraints in their daily schedules, ICT and individual and collective modes of transport, and asks the following questions: Which hotspots are the most popular and where are they situated? In what types of environments (ex. urban or suburban) are they found? Is there a relationship between the most frequented hotspots and commercial hubs or the most visited places? Who frequents WiFi hotspots and what do they do there? What are the various profiles of WiFi users?

The methodological strategy to answer these questions is three-fold. First, the geographic nature of WiFi hotspot distribution and use is investigated by mapping the hotspot network using GIS software and by comparing hotspot popularity with location and proximity to the public transportation network operated by the Réseau de transport de la Capitale (RTC). Second, WiFi use is examined through an Internet survey of 63 ZAP Québec WiFi hotspot users questioned about their use of wireless Internet, ICT and transport modes. Finally, an exploratory method using Christopher Alexander's Pattern Language (1977, 1979) is used to identify recurring spatial configurations of several of the most popular hotspots. The following sections present these methodological strategies in greater detail.

3.1 Spatial and temporal WiFi hotspot usage patterns

As shown by recent research, the use of Wireless networks varies both temporally and spatially. Analysis of municipal WiFi networks observes how mobile devices become an integral part of daily geographic movements (Afanasyev *et al.*, 2008; Tang & Baker 2002). The activity of network use is concentrated into different geographic regions based on commercial or residential functions. This information is gathered by looking at server or mobile phone logs. Whereas useful qualitative data can be gathered by interviews, valuable quantitative data can be collected simply by analyzing the information recorded by computers. This type of exercise can reveal that users not only connect at various hours of the day and in various locations, but that this behavior varies both daily and seasonally (Forlano, 2008).

In Montreal, a team of developers at Île Sans Fil, a wireless hotspot network in Montréal, has been developing the Wifidog Captive Portal, which allows local businesses to offer wireless Internet to their customers[19]. Whereas bottom-up initiatives succeed only sporadically, due to maintenance issues, Wifidog permits centralized control, allowing a single organization to monitor and address usage abuses and bottlenecks.

Constituted entirely of local volunteers, ZAP Québec has used the Wifidog protocol to build a network of wireless hotspots within the Quebec City area, founded on the belief that free wireless Internet democratizes information access in public spaces and benefits economic, community and cultural development[20]. The recent awarding of 200,000 Canadian dollars to the ZAP Québec organization by the Quebec City government will enable further development of the wireless Internet network for years to come (Therrien, 2009). An additional benefit of the centralized network monitoring provided by the Wifidog protocol is that ZAP Québec has been able to keep a MySQL database of the network activity of each of the wireless hotpots since its conception in 2006. As this research project hoped to understand how the usage of the different wireless hotspots fluctuates over time and differs by different sectors of the city, such a database constituted an important resource. While direct access to the database was never possible for reasons

[19] Wifidog, "About the Wifidog Captive Portal", http://dev.wifidog.org/wiki/About, accessed 20 April 2009.
[20] Zap Québec, "Tout sur ZAP", http://www.zapquebec.org/ailleurs-au-quebec/, accessed 20 April 2009.

related to privacy and technological hurdles, query requests were processed directly by a ZAP Québec correspondent, via a partnership that this research project established with the organization[21]. Queries included variables such as current user counts, business names and city sectors (by neighborhood) and were provided in PDF format, which was entered into an Excel database by the author. Interpreting the various outputs aided in understanding not only which ZAP hotspots are used most frequently and where they are located, but the types of places that are most visited as well.

A brief exercise compared the public transport availability in the city using information provided via the website of the Réseau de transport de la Capital (RTC) and the distribution of the most frequently used hotspots of ZAP Québec to compare the spatial affordances of the WiFi hotspot to the spatial accessibility permitted by the public transportation network. This analysis involved overlaying the map of the RTC network with one showing ZAP hotspots. This type of exercise had not yet been performed and served as a point of comparison and reference for the other stages of the research project. The data from the ZAP Québec central server was entered into Excel and then georeferenced using the open source Geographic information system (GIS) software QGIS[22]. The results of this exercise are presented in section 4.1.

3.2 An Internet survey of WiFi hotspot users

This research project investigated not only the infrastructural offering of the WiFi network, but also how the ZAP Québec WiFi network is used by its members. This portion of the research project therefore asked the following questions: How are WiFi hotspots used and chosen? What factors play into the choice of the WiFi hotspot as a built space? What are the technological profiles of the individuals and how does technology become enrolled in their everyday activities? What are their required and preferred modes of transport and when do moments of technology use overlap with times spent traveling or waiting? These questions were used to develop a questionnaire for an Internet survey that was administered via ZAP Québec to its users via the login pages of its different hotspot locations between August 2009 and January 2010. The questionnaire is centered around

[21] The partnership with ZAP Québec is contingent upon the research project's ability to supply the organization with both a portrait of its members and the environmental elements of the ZAP hotspot that make it important to its members so that it may orient future development plans appropriately.
[22] www.qgis.org

four themes: 1) the wireless hotspot as a place to carry out mediated activities, 2) transport modes and behavior, 3) ICT possession and use, and 4) basic demographic and socio-economic information as well as the number and flexibility of the individual's work hours. Together the four themes address the attitudes of the individual, attempting not only to understand individual practices with wireless hotspots, information and communication technologies and public transport, but what preferences or representations may inform individual behavior. The remainder of this section discusses each of the four themes in greater detail.

The first portion of the survey, related to the ZAP Québec WiFi hotspots, is based upon a number of observations from the literature. First of all, just as distance is not dead, neither is the importance of place. Prior to the start of this study, ZAP Québec regularly made available a list of the top fifteen hotspots[23], suggesting that certain places were attracting more WiFi users than others[24]. This research project wanted to understand the logic behind this popularity by looking at the preferences of users. Does it have to do with proximity to other services, the quality of the neighborhood, or the ambiance of the hotspot as a built space?

The first portion of the questionnaire also inquires into what activities people perform at the different locations they use WiFi. The literature suggests that while some go to a hotspot, for instance a café, with their laptop simply to work, others go in order to socialize and the mobile device simply serves as an excuse to linger. In other cases, visitors do both. Asking about activities performed by WiFi users helps understand how certain activities which once had to be performed in particular places are now being fragmented and performed in different spaces through the use of mobile devices and wireless technologies.

The second portion of the questionnaire poses questions related to transport mode choices. Whereas the participants are first asked about their modal practices to and from ZAP hotspots, this section is interested in the individual's preferred modes of transport and in the modes with which the individual has experience. Furthermore, due to a recent

[23] Defined as total number of visits, but not to be confused with the definition used in this study where popularity is the average number of visits per day since the opening of the hotspot.
[24] The ZAP Québec network is capable of monitoring and flagging abuses, such as the use of the WiFi signal by people in neighboring buildings. It was assumed that the majority of use occurred within the hotspot itself.

interest in how ICT use can render travel time productive, questions are asked about ICT use while using individual or collective modes of transport. By intersecting ICT and transportation use, the project sought to investigate possible complementarities between the two.

The third series of questions in the Internet survey inquires about the ICT devices WiFi users own and the devices they use. Additionally, questions concerning usage of social and professional networking sites as well as blogs are asked to evaluate how tech-savvy the participants are and to what extent their level of technical knowledge correlates with the number or frequency of activities performed using ICT devices. The final section sought to develop a portrait of the individual and elucidate the levels of complexity in the daily lives of the participants by examining their personal and professional obligations. The questions asked revolved around the number of hours spent working, the flexibility in the work schedule and the frequency that the person has to travel for professional or personal reasons.

A link to the Internet survey, which was developed using SurveyMonkey[25], was placed on the ZAP Québec hotspot splash pages, where users have to connect in order to sign on to the network. The ZAP Québec webmaster also posted a link to the survey on the organization's blog. Ninety-two responses were collected and 63 were used for analysis. The survey comprised 54 questions and took an average of 28 minutes to complete[26]. Respondents who did not complete the survey were eliminated as were employees of the hotspots, this latter situation being considered a workplace. The data collected by the Internet questionnaire were first exported in Microsoft Excel format and then imported into SPSS for quantitative analysis by the author. The results of the Internet survey are presented in Section 4.2.

3.3 A spatial analysis of WiFi hotspots in different sectors

The initial analyses served as the basis for a final analysis, which investigated the spatial layout of some of the most frequented hotspots in various sectors. The goal was to understand what spatial configurations were recurrent among the various hotspots, independent of building typology. The first step involved selecting a series of hotspots to

[25] www.surveymonkey.com
[26] Available in Appendix C.

be visited, using the analyses of the data from both the ZAP Québec central server and the Internet survey. The second comprised visits to a series of hotspots where spatial layouts were recorded and compared.

In order to attempt to approach spatial layout objectively, but qualitatively, the analysis referred to the *Pattern Language* developed by Christopher Alexander and his colleagues in the 1970s (1977, 1979). The theory of Alexander's pattern language is that activities cannot be separated from the place in which they occur (1979). As a critique both of modernist (Le Corbusier) and organic (Frank Lloyd Wright) building cultures, *The Timeless Way of Building* (1979) attempted to uncover through research what spatial practices have endured over time as mediators between humans and their built and social environments. These practices, called patterns, are the common denominator of what was developed as a language devised to create buildings and towns.

For Alexander (1979), patterns are enablers of events. The relationship is not causal, but relational. A language results from an interrelated series of patterns. To explain this, Alexander uses the example of "watching the world go by" (p. 70):

> We sit, perhaps slightly raised, on the front porch, or on some steps in a park, or on a café terrace, with a more or less protected, sheltered, partly private place behind us, looking out into a more public place, slightly raised above it, watching the world go by […]
>
> The action and the space are indivisible. The action is supported by this kind of space. The space supports this kind of action. The two form a unit, a pattern of events in space (p. 70).

The aim of using the pattern language was to determine what kind of language (group of patterns) supports the action "being online in the presence of others", which is how the phenomenon of using WiFi in public and semi-public places has been identified by Varnelis and Friedberg in the book *Networked Publics* (2008). The hypothesis for this analysis was that certain spatial configurations would be found consistently across different hotspots, regardless of building typology.

The analysis began by assembling a list of patterns that were thought to potentially contribute to the success of a hotspot as a place to be online in the presence of others (Appendix B). Not all 253 of Alexander's (1977) patterns were used. The patterns

(Table 2) were chosen based on conclusions drawn in the literature. For instance, Keith Hampton and colleagues (2008) suggest that the tendency for people to engage with co-present others in parks with WiFi partially depends on the number of opportunities for people to sit together. Bryant Park in New York City, for example, provides small tables that cannot accommodate more than one person. The same study also found that alcoves were used by WiFi users to retreat from public space. For this reason, a series of patterns addressing group and individual seating were selected. Other patterns were chosen based on theoretical works about the future design of the interstitial, edge (Bentley 1987) or third places (Oldenburg 1989) that mediate between public and private spaces and personal and professional activities, like cafés, parks and the like. Such spaces have been the subject of growing interest (Amin & Thrift 2002), particularly in the literature on designing cities for emerging work and life styles (Duffy 2008; Nicolaou 2006). The blending of workspaces and leisure spaces (in a sort of café-style format) is a growing trend in both innovative office designs (Pélégrin-Genel 2006) and in the appearance of neighborhood coworking spaces[27] (Duhamel 2009; Johnson 2003; Mitchell 2003). The final choice of patterns (Table 2) follows eight themes: 1) patterns related to the cardinal orientation of spaces; 2) patterns that connect the inside and outside; 3) patterns that delineate spaces; 4) patterns that attract people; 5) patterns that create places for people to be spectators; 6) patterns creating places for people to be together; 7) patterns creating places for people to be alone; and 8) patterns that contribute to the character of interior spaces.

This method of analysis is, to the author's knowledge, novel. Although the Pattern Language has been used elsewhere (Junestrand 2001; Junestrand *et. al.* 2001; Mohammed & Thwaites 2010) in order to investigate or communicate spatial configurations, the patterns themselves have not been used as the basis for an analysis of specific socio-spatial phenomena such as WiFi use. The specific hotspots visited and the results of this exploratory spatial analysis are presented in Section 4.3.

[27] A coworking space offers workers who would otherwise work at home or in a public space the opportunity to share services (like printing) while simulating the collaborative, social environment of a traditional office place.

Table 2. Patterns used for the spatial analysis.

Group name	Patterns
1. Patterns related to the cardinal orientation of spaces	105. SOUTH-FACING OUTDOORS 107. WINGS OF LIGHT 128. INDOOR SUNLIGHT 238. FILTERED LIGHT
2. Patterns that connect the inside and outside	106. POSITIVE OUTDOOR SPACE 112. ENTRANCE TRANSITION 140. PRIVATE TERRACE ON THE STREET 164. STREET WINDOWS 165. OPENING TO THE STREET 166. GALLERY SURROUND 192. WINDOWS OVERLOOKING LIFE 222. LOW SILL 236. WINDOWS WHICH OPEN WIDE
3. Patterns that delineate spaces	127. INTIMACY GRADIENT 131. THE FLOW THROUGH ROOMS 135. TAPESTRY OF LIGHT AND DARK 142. SEQUENCE OF SITTING SPACES 190. CEILING HEIGHT VARIETY 252. POOLS OF LIGHT
4. Patterns that attract people	110. MAIN ENTRANCE 121. PATH SHAPE 123. PEDESTRIAN DENSITY 124. ACTIVITY POCKETS
5. Patterns that create places for people to be spectators	125. STAIR SEATS 133. STAIRCASE AS A STAGE 241. SEAT SPOTS 242. FRONT DOOR BENCH 243. SITTING WALL
6. Patterns that create places for people to be together	129. COMMON AREAS AT THE HEART 139. FARMHOUSE KITCHEN 147. COMMUNAL EATING 185. SITTING CIRCLE
7. Patterns that create places for people to be alone	141. A ROOM OF ONE'S OWN 179. ALCOVES 180. WINDOW PLACE 183. WORKSPACE ENCLOSURE 231. DORMER WINDOWS
8. Patterns that create the character of interior spaces.	197. THICK WALLS 249. ORNAMENT 250. WARM COLORS 253. THINGS FROM YOUR LIFE

4.0 WiFi hotspots and users in Quebec City

The three methodological strategies brought together to investigate WiFi use in public and semi-public places revealed a variety of trends in the use of the wireless network, the profiles of WiFi users and the spatial configurations of the places where WiFi use is the highest. This chapter discusses the results from each portion of the investigation.

4.1 The geographic nature of wireless Internet use

The data acquired from the ZAP Québec central server provided information concerning the frequency of visits and the geographic disparities of hotspot use. Figure 2 shows the general layout of the ZAP Québec WiFi hotspots, with the exception of schools where WiFi use is available for students and faculty. The highest concentration of hotspots is located in the historic city center, including the pre-twentieth-century neighborhoods of Old Quebec, Faubourg Saint-Jean-Baptiste and Montcalm as well St-Roch and Limoilou. Hotspots further outside the city are mostly libraries and community or athletic centers. Considering that the hotspot network is funded mostly by the city (Therrien 2009), the abundance of public buildings is not surprising.

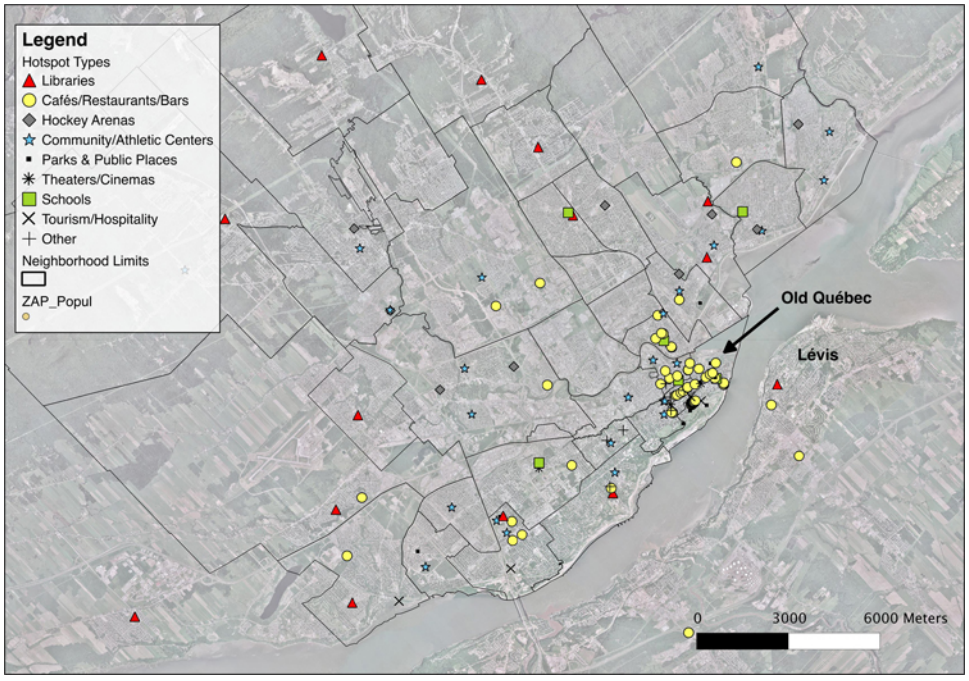

Figure 2. Distribution of ZAP Québec WiFi hotspots on the Quebec City metropolitan area, shown according to type.

Community and public athletic centers, parks and public places and libraries figure prominently on the list—after cafés, restaurants and bars of course (Table 3). This latter group however is more frequented than the other hotspot types, rivaled only by parks and public places (Table 4). Only two libraries are not located in an inner-city neighborhood among the twenty most popular hotspots.

Table 3. ZAP Québec WiFi hotspots by type and status of inclusion in study as of September 2010.

Type	Considered for the study (02/2006-10/2009)	Not considered*	Total (as of 09/2010)
Café/Restaurant/Bar	60	1	83
Community/Athletic Center	25	0	30
Library	14	14	27
Outdoor Park & Public Places	15	0	19
Hockey Arena	9	0	12
Tourism/Hospitality	4	0	11
Schools	6	0	9
Theater & Cinema	3	0	3
Other	8	0	17
Total	144	15	211

*Hotspots that are not monitored and therefore were not included in the study, as no visitor count could be obtained.

Table 4. The top 25 WiFi hotspots determined according to average number of visits per day.

Rank	Hotspot Name	Type	Average # visits/day	Sector of the city
1	Place d'Youville	Public place	10.86	Old Quebec
2	Au Bonnet D'âne	Café/Restaurant/Bar	9.12	Saint-Jean-Baptiste
3	Café Chez Temporel	Café/Restaurant/Bar	9.05	Old Quebec
4	Brûlerie Tatum Café	Café/Restaurant/Bar	8.05	Old Quebec
5	Étienne-Parent Library	Library	6.64	Vieux-Moulin (Beauport)
6	Charlesbourg Library	Library	6.30	Charlesbourg
7	Bar Le Sacrilège	Café/Restaurant/Bar	6.00	Saint-Jean-Baptiste
8	Bar Le Bâteau de nuit	Café/Restaurant/Bar	5.51	Saint-Jean-Baptiste
9	Grande-Allée Terraces	Public Place (Street)	5.32	Old Quebec
10	Fou-bar	Café/Restaurant/Bar	5.19	Saint-Jean-Baptiste
11	Le Périscope	Theater	5.00	Saint-Jean-Baptiste
12	La Fournée BIO	Café/Restaurant/Bar	4.86	Old Limoilou
13	L'Agitée	Café/Restaurant/Bar	4.60	Saint-Roch
14	Café Nagua	Café/Restaurant/Bar	4.54	Old Limoilou
15	Université du Québec – CG*	School	4.16	Saint-Roch
16	Hôtel de Ville	Public Place	3.91	Old Quebec
17	Pub Galway	Café/Restaurant/Bar	3.90	Montcalm
18	La Barberie	Café/Restaurant/Bar	3.72	Saint-Roch

19	Plaines d'Abraham Jardin	Park	3.53	Montcalm
20	Café La Mosaïque	Café/Restaurant/Bar	3.44	Lévis
21	Burger King Deauville	Café/Restaurant/Bar	3.43	Sainte-Foy
22	Bal du Lézard	Café/Restaurant/Bar	3.41	Old Limoilou
23	Pierre-Georges-Roy Library	Library	3.40	Lévis
24	Burger King Lévis Kennedy	Café/Restaurant/Bar	3.14	Lévis
25	L'Entract'	Café/Restaurant/Bar	3.14	Montcalm

*Although schools were not included, the entry hall of the Université du Québec offers places for passers-by to use WiFi.

Figure 3 illustrates the geographic distribution of the most frequented ZAP hotspots. Most are located in low-rise medium density mixed-use neighborhoods such as Saint-Jean-Baptiste, Old Limoilou and Old Quebec. The location makes them easily accessible on foot and by public transport. One exception to this rule is the Étienne-Parent library, which is located along a limited access highway where public transport passes infrequently. However, it is situated between two major power centers not far from a highway entrance, making it easily accessible to automobile drivers. Figures 4 and 5 illustrate two of the predominantly urban contexts in which the most frequented hotspots are located.

Figure 3. The top quartile of most frequented hotspots and the public transport system. Hotspot size relates to the average number of recorded WiFi unique connections since the opening of the hotspot.

Figure 4. Saint-Jean Street, Faubourg Saint-Jean-Baptiste (Source: Google Streetview)

Figure 5. Avenue Cartier, Montcalm Neighborhood (Source: Google Streetview)

The success of hotspots appears to depend on their proximity to places of public gathering and consumption. If this trend seems to favor urban commercial streets, it does not mean that WiFi gives these places an advantage over larger shopping conglomerates. In fact, indoor shopping malls are among the most desired places for WiFi installation according the web page moijezap.org (Table 5), where people can vote for places they would like to see ZAP Québec install WiFi. At this time, ZAP Québec does not offer WiFi in such places, as they are typically managed privately. Curiously, of the four malls on this list, two already offer their own WiFi, raising questions as to what ZAP Québec's service provides that makes it more attractive than the networks already in place. The current WiFi service is free and accessible to everyone, which differs from the situation at the Laval University student building, Pavillon Desjardins (ranked third), which provided WiFi to the university community through user name and password and where ZAP Québec's presence would provide WiFi to people outside the university community.

Table 5. The most requested places to install free WiFi access according to ZAP Québec*.

Rank	Name of Place	Type	Sector
1	Baie de Beauport	Park	Limoilou (Maizerets)
2	Colisée Pepsi	Sports Arena	Limoilou (Lairet)
3	Pavillon Desjardins	Main University Building	Sainte-Foy
4	Place de la Cité	Indoor Mall	Sainte-Foy
5	Quebec-Lévis Ferry	Transport	Downtown Lévis-Old Quebec
6	Quai des cageux	Park/Public Place	Cap-Blanc
7	Pub de l'Université	University Bar	Sainte-Foy
8	Place Laurier	Indoor Mall	Sainte-Foy
9	Les Galeries de la Capitale	Indoor Mall	Lebourgneuf
10	All of Avenue Cartier	Commercial Street	Montcalm
11	Cégep de Sainte-Foy	School	Sainte-Foy
12	Première Moisson Bakery	Café	Saint-Jean-Baptiste
13	Samuel Holland Park	Park	Saint-Sacrement
14	Bois-de-Coulonge Park	Park	Sillery
15	Place Sainte-Foy	Indoor Mall	Sainte-Foy

*Retrieved from http://www.moijezap.org/votez-pour-vos-zap on September 26, 2010.

Shopping malls are not the only places where wireless access to the Internet is desired. Many outdoor leisure places figure among the most voted. Five of the fifteen places are outdoors, attesting to the popularity of WiFi use in these areas. For example, upon installation of free WiFi serving the Plains of Abraham Garden, a three-acre park and number 24 of the 144 hotspots analyzed—in the spring of 2009, the WiFi use jumped from

5 to 593 in a three-month period. Figures 6 and 7 show the Plains of Abraham Garden and the Quai des Cageux Pier. The former is one of the most popular places to use WiFi while the latter, part of a recently completed waterfront renovation project, is one of the outdoor places where WiFi is frequently requested[28].

Figure 6. One of the most popular WiFi parks, Plaines of Abraham Garden (Source: Google Image, author: metallyza).

[28] As of October 2010, moijezap.org.

Figure 7. Quai des Cageux Pier, Samuel de Champlain boulevard, Cap-Blanc, (Source: Google Streetview)

Hotspot requests also seem to follow a transport networks in Quebec City. For instance, the ferry connecting the downtown with the south shore city of Lévis, makes nearly 80 trips daily, transporting tourists and workers throughout the week and on the weekend. Even though the ferry ride lasts only about ten minutes, the ferry is the fifth most requested place for WiFi installation according to ZAP Québec. ICT use, as several of the reviewed studies indicated is a popular way to spend travel and wait times. It is possibly for this reason that the Première Moisson Bakery located near Old Quebec is so high on the list—it is situated directly in front of a major public transportation hub (Figure 8).

Figure 8. The bakery Première Moisson is situated directly in front of a major public transportation hub, the Place d'Youville along the Metrobus express lines (Source: Google Streetview)

This section shows that simply using data from the server of a 144-hotspot WiFi network can reveal differences in wireless Internet use on a city-wide scale. These differences seem initially to follow a pattern of places of consumption and of mobility. That is, the most frequented hotspots are located in places where people gather, and particularly on commercial streets in denser city neighborhoods. Certain hypotheses can be formulated around WiFi use by looking at the places where free WiFi is most desired. These can be grouped into places of consumption, leisure and travel, like indoor shopping centers, parks and places nearby public transportation. The server data is nevertheless limited. Understanding WiFi use also requires questioning the users directly.

4.2 Local relaxers, urban mobiles and suburban Parents: WiFi user profiles

From August 2009 to January 2010, an Internet survey was conducted among ZAP Québec WiFi users. While the 63 responses cannot be used to make generalizations about WiFi users in Quebec City, it was possible to define three WiFi user profiles. This section begins with a description of the sample, presenting first the general demographic profile, followed by sections looking at the respondents' use of WiFi, information and communication technologies (ICT) and different modes of transport. The last section presents the three WiFi user types identified in the sample.

4.2.1 Something for everyone: the diversity of WiFi users

Sixty-three WiFi users responded to the Internet survey. According to recent literature, WiFi users are typically young, male and relatively well off (Forlano 2008). Among the sixty-three respondents, men between the ages of 25 and 34 were just over a tenth of the sample (7/63). The higher representation of other age groups presents a unique opportunity to examine the WiFi practices among users that are perhaps under-represented or overshadowed in other studies.

The gender ratio is about two thirds male and one third female (40 to 23). The women in the group comprise more of the younger age groups than the men (Figure 9), who dominate in the age groups over 35, unlike Forlano's sample (2008). This is not surprising, as the gender gap in Internet use in Quebec is gradually closing, starting with the younger generations (CEFRIO 2009, 2010). Young people are growing up today with ICT. This may explain why the 18-24 group is slightly overrepresented. Women WiFi users in the sample are also, over all, more educated than their male counterparts (Figure 10).

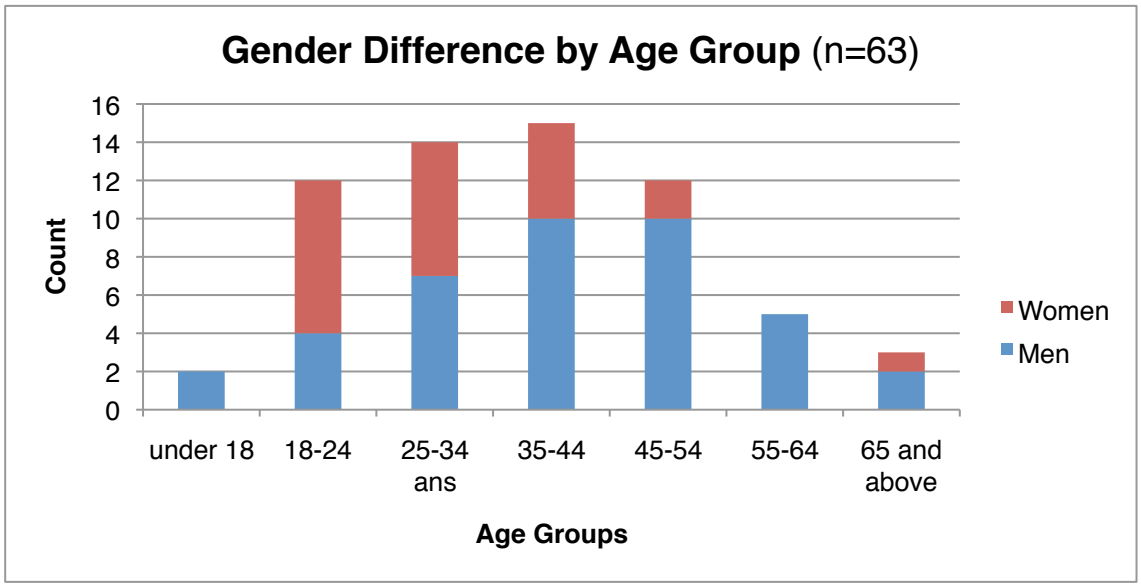

Figure 9. Gender differences [Q37] according to age groups [Q36]. Many of the younger WiFi users are women.

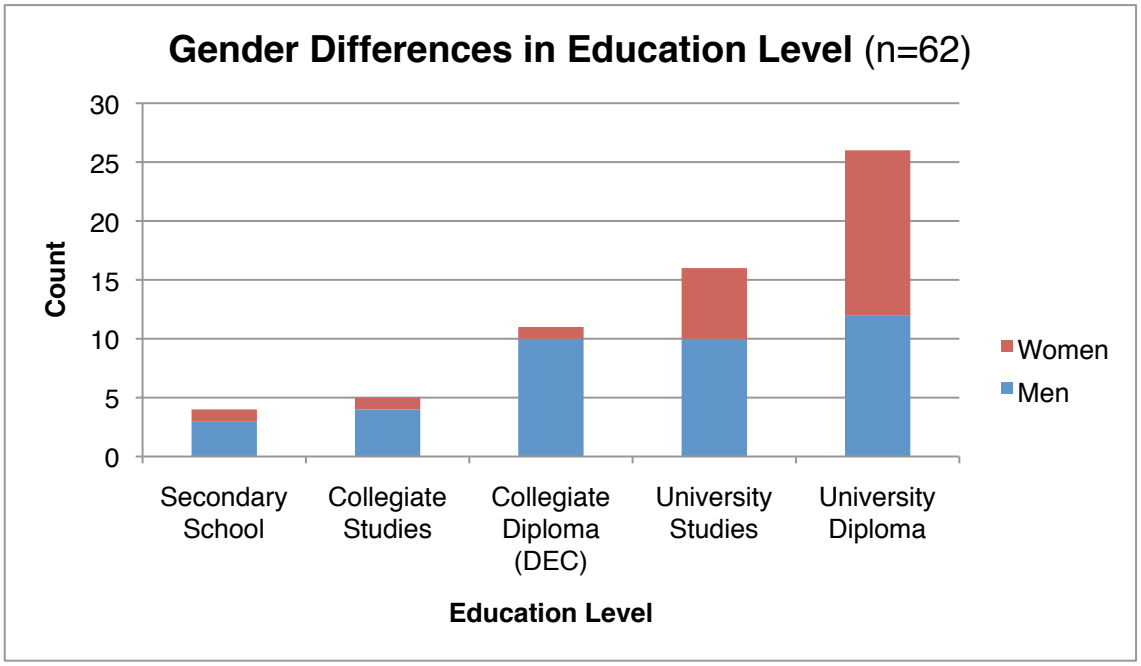

Figure 10. Gender differences [Q37] in education level [Q39]. Female WiFi users in the sample are more educated than male WiFi users.

The variety of age groups and education levels is also reflected in household characteristics. The number of children is of particular interest, because the presence of young children has been shown in Belgium to highly affect the daily mobility and activities of parents (Montulet & Hubert 2008), which could ultimately have an impact on the extent of WiFi use and on the choice of public and semi-public places where this use occurs. A little over one third of the respondents live in households with children (25/63[29]) and 23 of these households have children under the age of 12. Respondents living in households with children tend to have a greater household income (probably because more of these respondents live with an employed partner) and have access to a greater number of automobiles during the week[30]. Respondents living in households with children are also more likely to own a home rather than a condominium or be renters of an apartment (Figure 11).

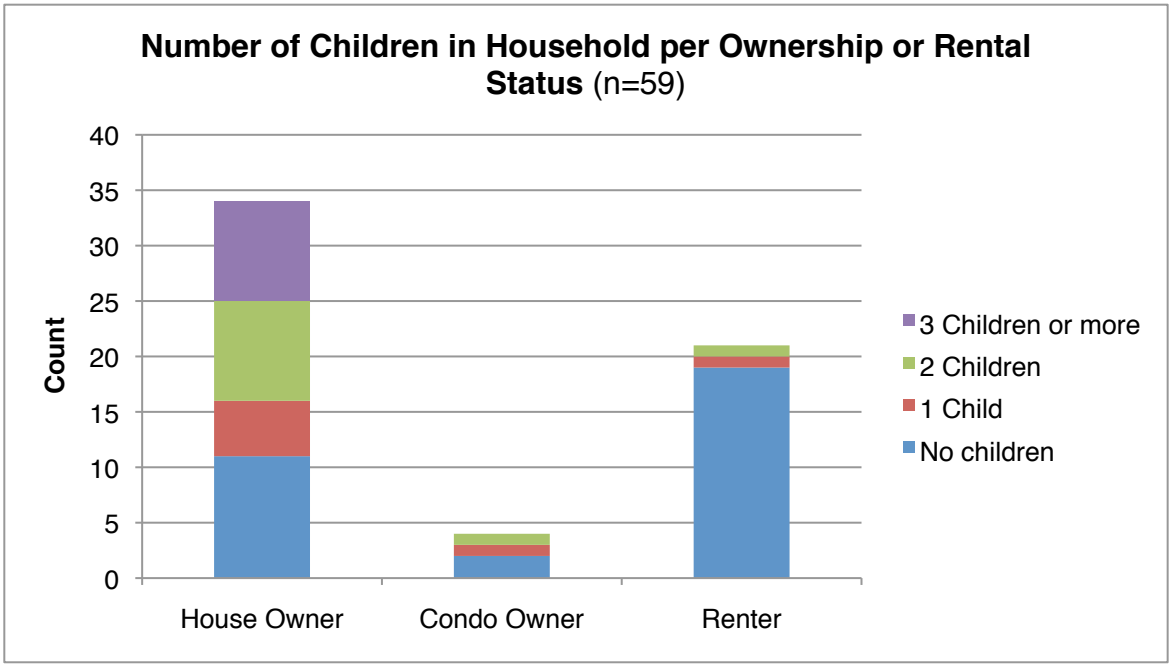

Figure 11. Tenure of respondents [Q50] per number of children in the household [Q38].

In addition to household structure, the profession of the individual is also important in structuring daily mobility. In a traditional nine to five work scenario, daily work-related

[29] This number does not include households where the "children" were either siblings or housemates of the respondent.
[30] For more information on correlations between individual and household variables, see Appendix A1.

travel dominates the structure of daily mobility on a week day (Carpentier 2007). Studies show that ICT use is having an impact on the way people are able to conduct work-related activities outside the home and office (Kakihara 2003; Lenz & Nobis 2007). Considering that the WiFi hotspot can become a temporary workplace outside these two places (Forlano 2008), the Internet survey paid particular interest to the work practices of WiFi users.

More than half of the respondents work either full or part time (42/63). The number of workers in the sample is evenly distributed across the four age groups in the age range 18-54 (Figure 12). Most of the respondents between the ages of 18 and 24 are students. Several retired individuals over the age of 55 are also WiFi users. The 42 workers work anywhere from four to twelve hours a day and from thirty to sixty hours a week, and are anything from teachers to consultants and computer technicians. The literature review revealed that, in particular, the flexibility of an individual's work hours could be correlated both with changes in travel behavior and ICT use (Srinivasan & Athuru 2004, Ohmori & Harata 2008). Work schedule flexibility was investigated by looking at whether or not the respondent's work schedule varied on a daily basis[31]. Forty-two of the 63 respondents are considered workers, meaning that they work either part or full time and do not study full time. Only one person studies part time while working full time. Twenty-two of these 42 workers have a work schedule that varies daily, although the type of job itself may offer greater flexibility. Whether or not this affects the way hotspots are frequented will be examined by looking at the WiFi use of the sample respondents.

[31] The "variability" of one's work hours by day week, month, or year seemed less subjective than asking about "flexibility" directly.

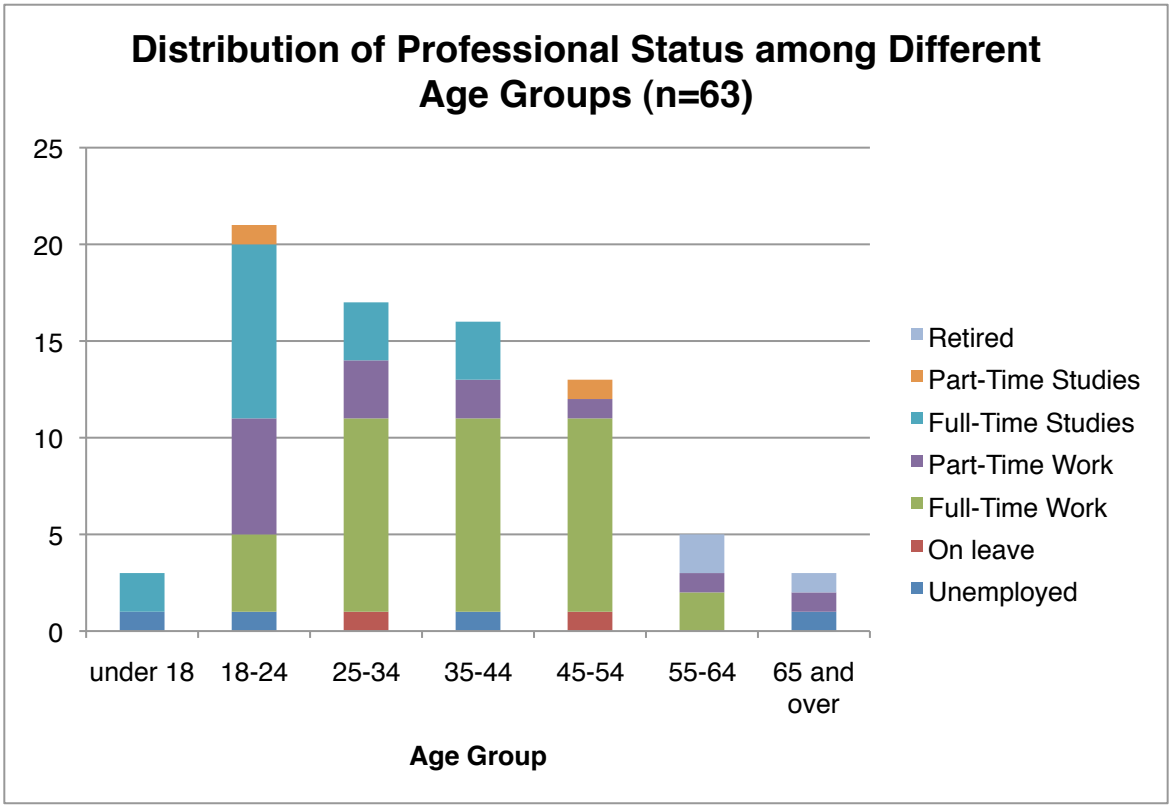

Figure 12. Professional status [Q43] of different age groups [Q36]. Professional status was a multiple response question**.**

4.2.2 Online and offline in public and semi-public spaces

Zap Québec has managed WiFi hotspots since 2006. Ten of the 63 WiFi users surveyed have been members since the beginning, but most have been members for about seven to eleven months. While it is unknown whether or not the respondents were regular WiFi users before using the ZAP Québec network, connecting to the Internet in public and semi-public places is something that has become a regular practice. In fact, nearly half (36/63) of the respondents frequent hotspots one or more times a week. For one fifth (13/63), hotspots are frequented one or more times each day.

The respondents were asked to name which hotspots they frequented regularly (whether part of the ZAP network or not) and which were their favorites. Little difference is observed between these two lists (Table 6). For the most part, the WiFi users go back regularly to their favorite hotspots. When given a choice of reasons that the favorite hotspot is so attractive, most respondents replied that it was due to the “ambiance” (24/56)

of the place, followed by the number of places to sit (20/56) and the proximity to one's home (18/56). While the latter two are easier to measure, "ambiance" is relatively ambiguous. Possible elements[32] comprising the notion of ambiance is discussed later (Section 4.3).

Table 6. Respondents' most frequented and preferred hotspots.

Top Frequented (frequency)	Top Favorite (frequency)
*Gabrielle-Roy Library (11/63)	*Café Chez Temporel (6/63)
*Place d'Youville (6/63)	*Plaines d'Abraham Park (6/63)
*Café Chez Temporel (6/63)	*Gabrielle-Roy Library (6/63)
*Charlesbourg Library (5/63)	*École de Cirque de Québec (School) (4/63)
*École de Cirque de Québec (School) (5/63)	*Le Bal du Lézard Bar (3/63)
*Plaines d'Abraham Park (4/63)	Place de l'Hôtel de Ville (3/63)
Brûlerie Tatum (4/63)	Charlesbourg Library (3/63)
Étienne-Parent Library (4/63)	*Place d'Youville (3/63)
*St-Roch Garden (3/63)	Marie-Victorin Library (2/63)
*Le Bal du Lézard Bar (2/63)	Library Saint-Charles (2/63)
*Charles-H.-Blais Library (2/63)	St-Roch Recreation Center (2/63)
Jacques-Amyot Indoor Pool (2/63)	*St-Roch Garden (2/63)
Sylvie Bernier Indoor Pool (2/63)	*Charles-H.-Blais Library (2/63)

*indicated hotspots that are found are both most frequented and preferred.

If most respondents frequent their favorite hotspots relatively often, how does this behavior fit into their daily schedule and what is its relationship to work activities? On the weekdays, the dominant periods are outside meal times—between 1pm and 5pm (33/61) and after 5pm (33/61). There is not a great difference on the weekend. Interestingly, breaking these periods up by workers and non workers reveals that workers spend as much time as non-workers in hotspots outside meal times (Figure 13). This does not mean however that that these individuals are not working. For 40 of 62 respondents, the hotspot is a place where work activities are carried out. Thirty (30/40) of these individuals

[32] Future studies should use face-to-face interviews to investigate ambiance as something subjectively comprised of physical and social elements. Directions for future research are discussed in Section 5.

are identified as workers and one sixth (5/30) go as far as consider the hotspot a primary workplace[33]. The remaining 25 claim the hotspot as a secondary workplace.

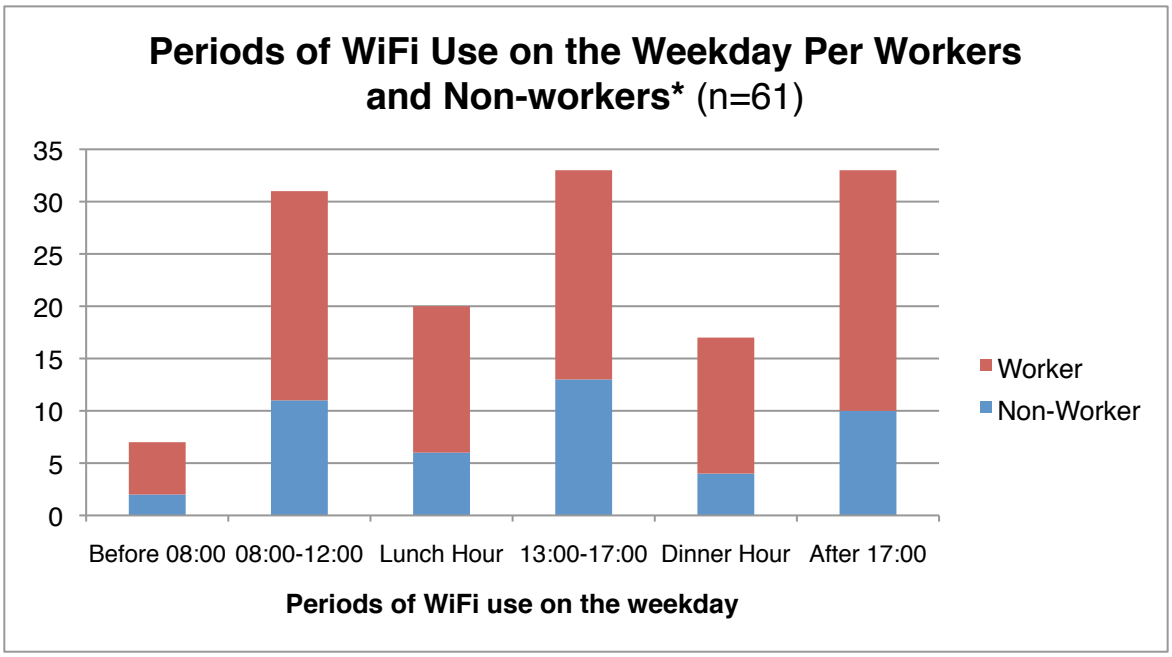

Figure 13. Periods of WiFi use on the weekday [Q05] per professional status [Q43]. Workers are as present during non-meal times as non-workers. *Workers are individuals whose main activity is full or part-time work and who are not students.

In the twenty-first century, it is not possible to say that the hotspot suddenly takes on the single role of a workplace. If mobile devices blur the interaction that individuals maintain with colleagues, this spreads into their personal lives as well. When asked what activities were performed and whether or not they were personal or work-related, several activities were frequently considered both, like email (Figure 14). Chatting online and listening to music are typically non-work activities, while reading and writing email as well as searching for information are both personal or professional. Few respondents shop online or work on writing a blog.

[33] Any survey respondents who were employees of the hotspot where they use WiFi were not included among the 63 cases used for analysis. The reasoning behind this is discussed in Section 3.2.

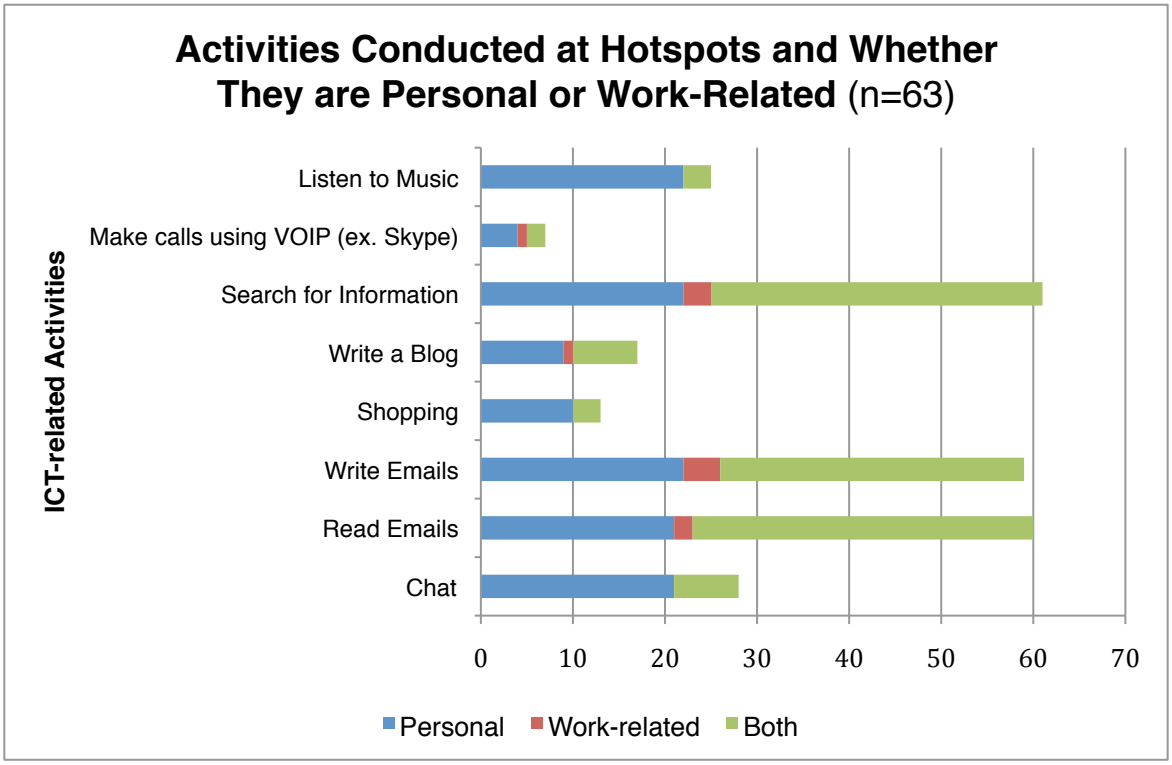

Figure 14. Activities conducted at hotspots and whether they are personal or work-related [Q10]. Activities such as searching for information and writing and reading emails are frequently both for personal and professional reasons.

The types of activities performed with ICT can depend on the affordances of the devices (Forlano 2008, Brown & O'Hara 2003). In this sample, however, almost all respondents use laptops at hotspots (56/62). No significant differences could be drawn between the activities performed by laptop users in comparison to those with MP3 players (23/62) or smart phones (10/62). It would be difficult to divide uses between devices without a more detailed investigation and a larger sample, as many users are multimodal—meaning they have multiple devices that are WiFi-enabled. While using one single device was still the most common, (35/63), some respondents used two (22/63) or even three devices (5/63). The additional devices were often MP3 players and sometimes, but more rarely, smart phones.

These mediated activities are conducted at hotspots alongside several offline activities. Working without using the Internet (36/58), eating and drinking (33/58) and reading offline (33/58) are among the most common. When asked whether they also meet

up with friends, colleagues or clients, 24 and 16, respectively, do the former two while only 5 people ever meet up with clients.

Despite the sometimes social nature of WiFi use in public and semi-public places (whether this occurs online or offline), most of the respondents (52/62) indicated going to hotspots alone, although sixteen also mentioned going with friends and thirteen with family members. In comparing the tendency to go alone with that of meeting up with others, it is apparent that even while the respondents meet up with others, they rarely arrive to the hotspot with them. While this study chose to not pay particular attention to the social aspect of WiFi use, it has been noted elsewhere that people like to use WiFi in order to be around other people, even if they choose not to interact with them (Forlano 2008; Gupta 2004).

The literature review suggests that many of the activities performed at hotspots are ones that would otherwise have been performed at home: in the case of those who conduct work-related tasks at hotspots, the decision to undertake these tasks remotely—but not in the home—is due to a lack of room in the home for work tasks (Gupta 2004). Our results in the Quebec City sample speak differently. More people with a workplace at home (25/39) chose to work at hotspots than those without a dedicated place to work at home (14/39), independent of whether they live in an apartment, condo or detached house. The frequency at which the respondents worked at home is actually positively correlated with whether or not the individual performed work related tasks at the hotspot[34]. This means that the respondents who work at hotspots are likely to work at home more frequently than those who do not work at hotspots, revealing a sort of complementarity between public and semi-public places and the home as different elements of a work environment. The hotspot therefore fits into a larger ecology of places of ICT use. It is for this reason that the survey also looked at the general ICT profile of the respondents, their households and the various places where ICT are used.

4.2.3 ICT use in the home and on the go

ICT use is integrated into preexisting technology use. By comparing the types of devices available in the home and workplace, it is clear that the mobile devices used elsewhere by the Quebec City WiFi users are the ones that are brought into public and semi-public

[34] Chi-square: χ^2=20.426, df=5, ρ=0.001 Cramer-V: 0.579

places. If a certain set of devices makes up an individual's ICT toolkit (Schroeder 2010), the mobile devices allow common practices to be carried from the home and workplace out into public and semi-public places (Nielsen & Fjuk 2010). In fact, all respondents except seven have wireless Internet access at home (56/63). WiFi use in hotspots generally complements use at home (see also Forlano 2008).

Going to a hotspot and connecting to WiFi is not the only way that the Internet is becoming mobile. Mobile phone companies were beginning to offer competitive data plans for cell phone users in 2008, improving access to what is called the "mobile Internet" (Nielsen & Fjuk 2010). At the time of the study, the iPhone had only recently been released and data plans were still pricey and not adapted to a leisurely use[35]. In fact, only 3.7 % of the adults in Quebec accessed the Internet on their mobile phone in 2007 (CEFRIO 2008). The number climbed to 8.1 % in 2008 and reached 13.4 % in 2009 (CEFRIO 2010). Despite this increase, use of the cell phone to access the Internet was not heavily observed in this study[36]. Only ten people in the sample of 63 access the Internet on their cell phone. The demographic characteristics of this group are similar to the larger sample, although there were almost as many women (4/10) as men (6/10), no predominant age group and slightly more workers than non-workers.

For nine of these ten users of the mobile Internet, the phone is one of the devices used to access WiFi at hotspots. This means that, although the individual has the ability to use the cell phone network to access the Internet, he or she chooses instead to use the WiFi available at the hotspot. The decision may be related to current costs and speeds of cell phone access to the Internet. As no Canadian telecommunications company offered unlimited data plans before Fall 2010, switching over to WiFi allows the smart phone user to avoid exhausting a limited data plan, while possibly taking advantage of a faster connection to the Internet. In this way, WiFi use complements the use of the cell phone network in accessing the Internet with a cell phone. Whether this complementarity exists for long will depend on the decrease in data plan costs and the increase in data transfer speeds on cell phone networks.

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[35] As of Fall 2010, mobile phone companies now offer unlimited data access plans to social networking sites, which targets a younger clientele. Cell phone data plans would have previously been more popular among business people.

[36] When connecting to a hotspot on the ZAP Québec network using an iPod Touch or iPhone, the login page disappears once the process is completed, meaning that these users would not have seen the link to the survey.

The survey also looked at the use of social media by WiFi users. More than two-thirds of respondents (43/63) use at least one form of social media, with all but two (41) being members of Facebook, just under half using the mobile blog service Twitter (19), over a quarter the professional network service, LinkedIn (12) and only one out of five MySpace (9). Social media use was more common among the younger members of the sample, with half (22/41) of Facebook users being between the ages of 18 and 34.

Socializing both online an offline allows individuals to manage larger groups of contacts (Pew Internet 2009) and can be a strategy to keep in touch with many people at once, whether due to distance or time constraints. Email versus telephone use was investigated to determine how often the respondents in the sample took advantage of asynchronicity in keeping in touch with colleagues, clients, family and friends. Among these four, respondents email rather than call colleagues the most often (see Figure 15). Friends actually fell second on this list. Clients were also frequently emailed, but by fewer people. Communication with family on the telephone was replaced the least often by emailing, although synchronous communication with family members may be more highly valued. While the relationship is not statistically significant, social media users (41/63) tended to email instead of calling their contacts more often than non social media users (22/63).

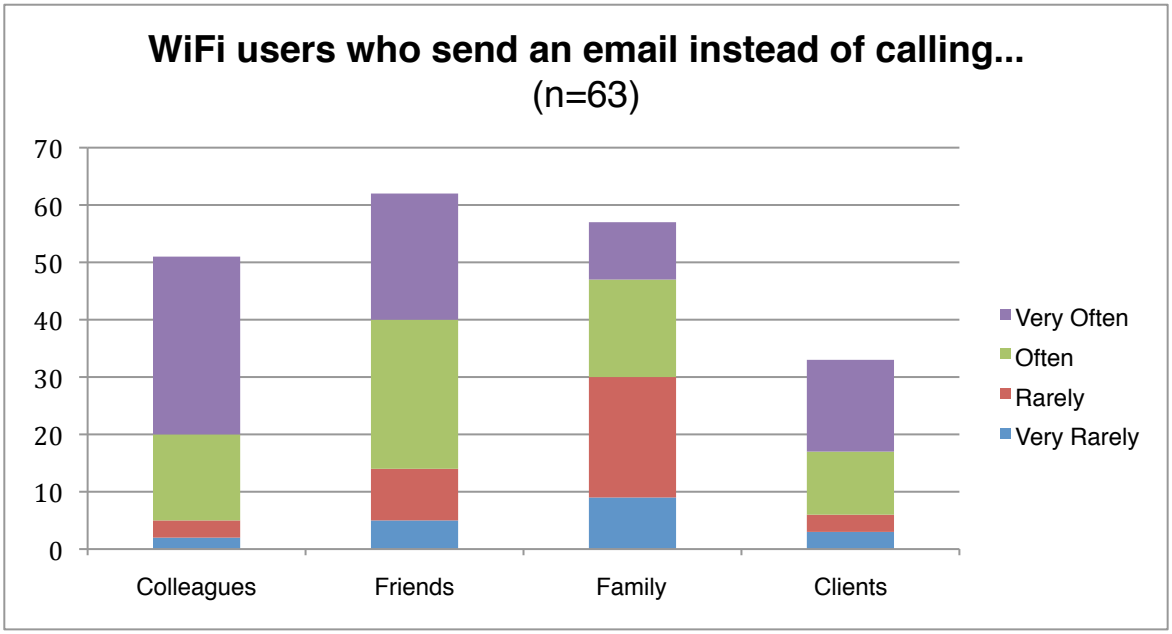

Figure 15. WiFi users who send an email instead of call colleagues, friends, family and clients [Q32]. Contact with the family is the least substituted by email.

The use of email versus the telephone was addressed to verify the hypothesis that email use would be a strategy to save time and manage daily complexity. In order to do this, the responses to these questions were compared with others variables that are typically correlated with complexity such as number of children and the number of working hours (Montulet & Hubert 2008). This analysis observed a greater tendency in sending emails to colleagues and clients (and somewhat to friends) among people who work frequently at home and who have a greater number of work hours per day[37]. Emailing instead of calling clients was the only practice that was more common among families with children. Sending emails to one's family members was less common in the sample and therefore was not strongly correlated with any individual or household variables. This may be due to the fact that sending emails to one's family members depends on a variety of other factors such as the geographic distance of family members and the frequency with which they are visited, which were not addressed in this survey. The questionnaire regrettably would not have captured people who use Facebook to keep in touch with family members.

[37] Refer to Appendix A.2 for bivariate correlations.

Using ICT to communicate with others is one strategy among many to integrate ICT into time-saving practices. In order to investigate the larger motivations behind ICT use, the respondents were asked to agree or disagree with a series of statements. More than three quarters of respondents (47/62) either partially or completely agreed with the first statement in regards to ICT improving their productivity (Figure 16). The great majority of WiFi users surveyed also partially or completely agreed with the next two statements with regards to ICT allowing for more flexible daily planning or more productivity. Fewer respondents felt that ICT enabled them to avoid traveling, although this is not surprising as substituting certain trips with ICT creates opportunities for other types of trips (Mokhtarian 2002).

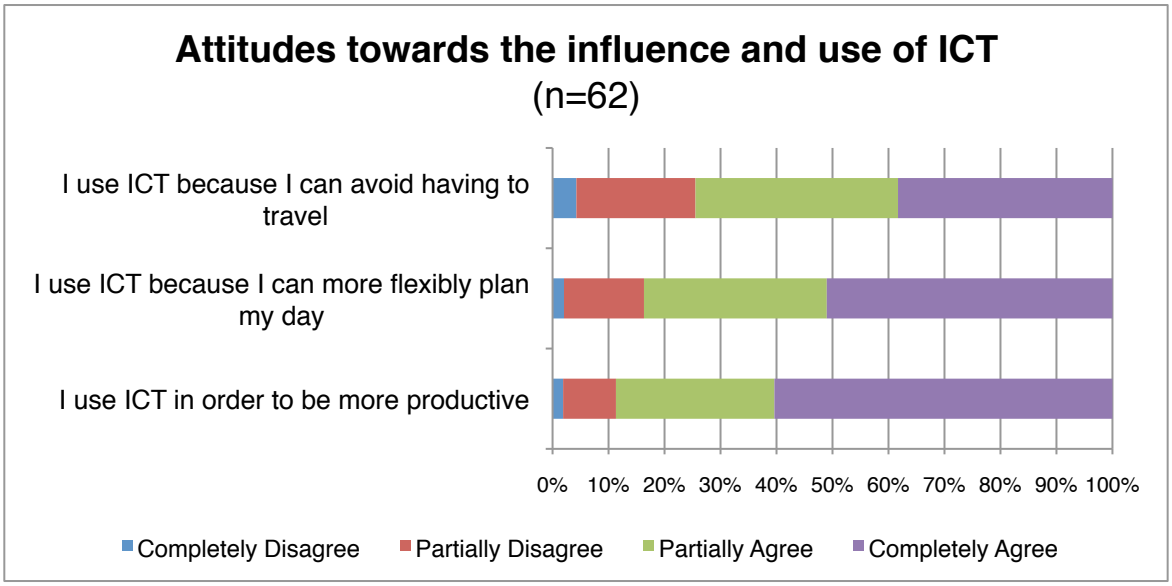

Figure 16. Attitudes towards the impact and use of ICT [Q33].

The various responses given to these statements tend to be positively related to the frequency of working at home and the number of hours worked per week, meaning respondents with more working hours acquiesced more frequently with these statements. Also, using ICT to be more productive and to avoid traveling is more common among households with children that rely on their car for daily travels. Comparing these factors with the tendency to work at WiFi hotspots suggests that using wireless Internet has become part of a strategy for managing daily life. In fact, respondents who preferred emailing over telephoning colleagues and clients and who partially or completely agreed

with the value of ICT were more likely to be the WiFi users conducting work-related activities at hotspots.

The value of having free wireless access to the Internet in public and semi-public spaces was expressed in an open-ended question by 61 of the 63 respondents. While the comments were brief, they revolve around five central ideas (Figure 17). One of the main conclusions that can be drawn from these statements is that having free WiFi in many places affords a freedom of movement and a constant connectivity, whether the individual seeks to work in a variety of places or simply spends downtime using Internet access. As one respondent stated: "I can work during my children's various activities"[38] (R37, Female, 35-44 years, 3 children under 12).

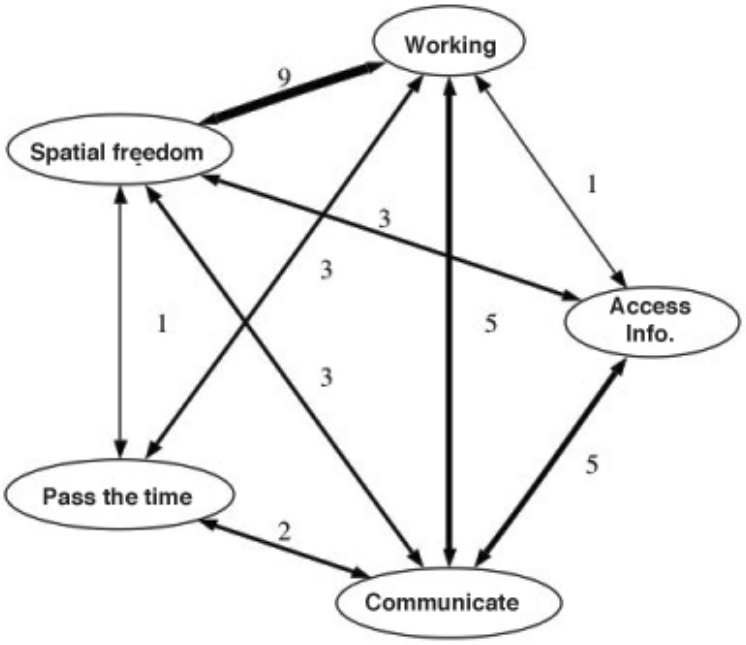

Figure 17. Recurrent themes in responses to an open-ended question on the benefit of having free WiFi in public and semi-public places.

The ubiquity of WiFi is also beneficial in the eyes of the survey respondents because it allows them to access information and maintain contact with others while on the go. In this way, waiting and traveling times "can be used productively" (R85, Female 45-54 years) in order to optimize "time that would otherwise have been lost" (R89, Male, 45-54

[38] Citations used here from the Internet survey have been translated from French by the author, attempting to preserve as much as possible the original meaning of the statement.

years). Some of the younger respondents use it to "entertain oneself while waiting and stay in contact with others" (R72, Female, 18-24 years) as WiFi enables everything from "reading [to listening to] music, [or watching] videos [on] YouTube" (R01, Male, 24 years).

Using ICT to productively or leisurely spend time waiting and traveling is something which has been investigated recently as a way to reevaluate travel time as something which can be perceived as time gained rather than time lost (Lyons *et al.* 2007). Several WiFi users in the sample use their mobile devices on various modes of transport (Figure 18). Buses (44/63), bus stops (41/63) and train stations (42/63) are the places where ICT are used the most often by the respondents. The degree of mobility of each respondent was calculated by tallying the number of different places where ICT devices are used. While the average number of different places is 3.62, almost one third (20/63) of the respondents use ICT in all of the six places listed. The use of ICT and transport may in some ways be related. It is for this reason that the survey also looked at travel modes used by respondents to conduct daily travel.

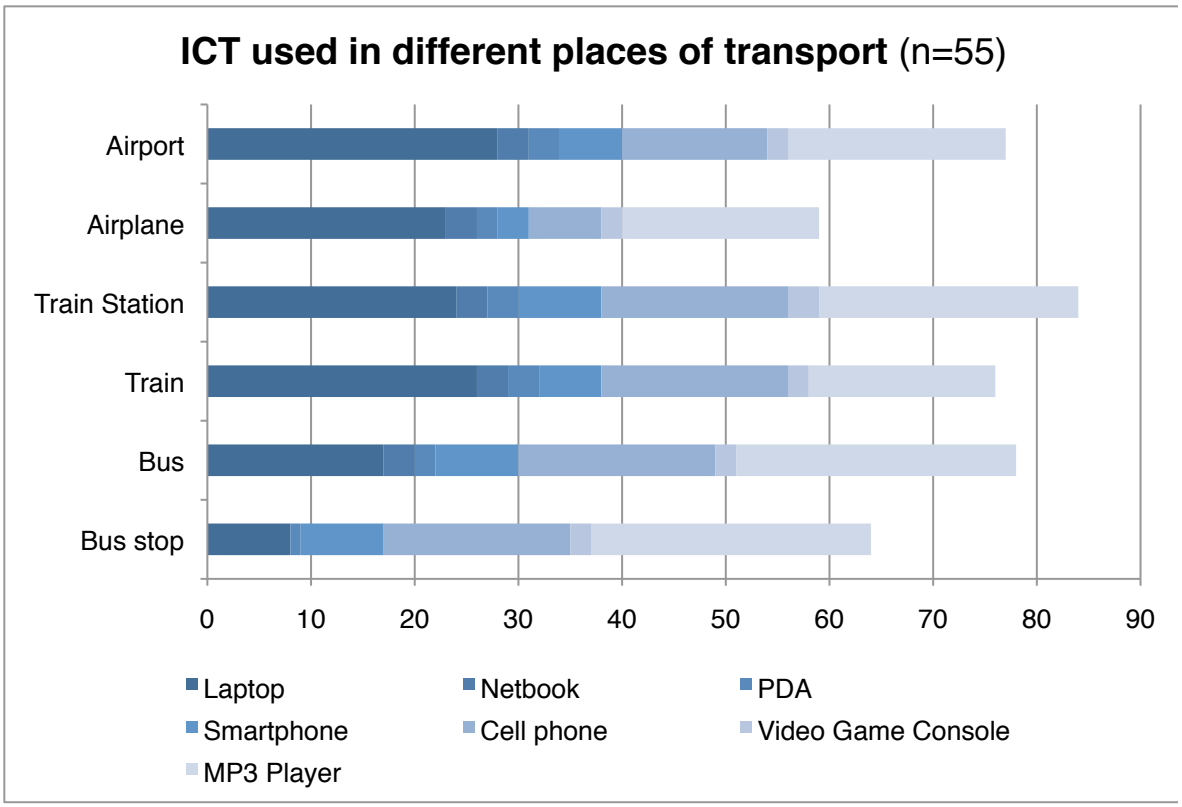

Figure 18. ICT used (with and without Internet access) in different places of transport [Q26].

4.2.4 Geographic movement and modes of transport

As described in the literature review, researchers are looking more and more at transportation modes and ICT use as complementary ways of dealing with mobility constraints (Couclelis 1994, Kesselring & Vogl 2008, Lenz & Nobis 2007, Mokhtarian 2002). WiFi users in New York City were found to duck in to coffee shops to spend time online between meetings, while for others, the ambiance of the hotspot is enough to convince the person to travel across town, whether by train or on foot (Forlano 2008). What about WiFi users in Quebec City? How do they travel to their hotspots? How is ICT used to plan trips?

When presented with four possible modes of transport they might use to travel to their favorite hotspots, more than half of respondents chose “on foot” (32/61), half “by car” (30/61) and four out of ten “by public transport” (25/61); only 10 chose “on bike”. As the question could have multiple responses, several modes of transport could be used. Whether they were combined was not captured by the question, but further analysis revealed that automobile users were less likely to use several modes than respondents who chose other modes. People who walked, for instance, were likely to also choose public transport. Of the 10 cyclists, seven also walked or took the bus. Only 2 of the 61 respondents who answered this question used all four modes of transport[39].

In order to find out how WiFi users took advantage of ICT for planning trips, respondents were given a list of five trip planning and information tools[40] and were asked to check each of the places in which they used them[41]. In terms of planning public transportation use, the Trajecto service was most often used at home by about half of the respondents (26/53), followed by a quarter who use it at the office (13/53) and a slightly lower number who use it at hotspots (11/53). Among these same individuals, Google Maps is also used most often at home but by a larger number of respondents (44/53), although it is used at the office by about half of this same group (26/53), while traveling (17/53) and at hotspots (14/53). Few (4/53) used the Québec511 Internet and telephone-

[39] Bivariate correlations are available in Appendix A.3

[40] From the following choices: Trajecto (the public transport planning tool produced by the city’s bus network); GoogleMaps (able to be used in Quebec City for planning trips by car); Québec511, a traffic alert service accessible by phone or mobile device; GPS on the phone; and GPS in the car.

[41] From the following choices: The home, the office, while traveling and hotspots.

based traffic alert service and telephone-based GPS (5/53). Trips were planned with GPS in an automobile mostly while on the move (15/53).

The trip planning tools were most often used by people who use a related form of motorized transportation, which is not surprising. However whether they currently take advantage of planning tools or not, two thirds or more of WiFi users would use WiFi on public transport to get travel information (46/62) or to use the Trajecto trip planning service (40/62). This is also true for respondents who do not use public transport regularly. In fact, the majority of non or infrequent public transportation users (27/62) completely or partially agree that WiFi use would make traveling (21/27) and waiting (20/27) for public transport more enjoyable, suggesting that a captive audience for such a service extends beyond the most frequent users to those who use public transport only occasionally.

The 63 WiFi users who responded to the Internet survey constitute a relatively heterogeneous group. Various age groups and income levels are represented. Most are workers with flexible work schedules, while others are students or retirees. Several respondents come from households with small children. For most of the sample, the use of hotspots does not follow a 9-to-5 rhythm, nor is there a large difference between weekend and weekday behavior, even though these public and semi-public places are at times principal or secondary workplaces. As the previous sections have shown, ICT use extends beyond the walls of the hotspot and into places of public transport. The benefit of having ubiquitous WiFi seems to center around the ability to be mobile, but constantly connected to people and information, in order to work without being confined to one place and to use waiting and travel times productively. But which profiles stand out the most? What behaviors carry across the diversity of the sample? The following section presents three recurring WiFi user profiles that were revealed by further analysis.

4.2.5 WiFi user profiles: local relaxers, urban mobiles and suburban parents

In order to better implement WiFi access and to design the places where WiFi is to be used, it is important to know what types of people are using WiFi and in what contexts. This study remains exploratory and does not seek to generalize about WiFi use and users in all cities or even for the entire Quebec Metropolitan Area. From the group of sixty-three respondents, there are however three user profiles that emerge. Understanding how the

use of WiFi hotspots differs across these groups could aid in developing implementation objectives as well as future studies.

The three groups were determined through a cluster analysis performed using a series of variables related to wireless Internet and ICT use, transport modes and the level of spatial flexibility afforded by the person's job. The following variables were chosen:

1. The ICT used by the person at the hotspot [Q18]
2. Amount of time spent at the hotspot on average [Q08]
3. Frequency that the respondent goes to a hotspot [Q06]
4. Whether or not professional activities are conducted at the ZAP [Q13]
5. Whether or not the respondent accesses the Internet on his or her cell phone [Q19]
6. Transport modes used regularly to go to hotspots [Q07]
7. Transport modes preferred by the respondent [Q27]
8. Transport modes most frequently used by the respondent [Q41]
9. Number of cars available during the week and on the weekend [Q41]
10. Frequency of working at home [Q49]

Variables related to transport mode and ICT use were combined as part of the hypothesis that the two would be influential in developing hotspot use habits. A hierarchical cluster analysis was performed to determine the optimal number of clusters (Figure 19).[42]

[42] A method appropriate for samples with a low number of respondents. Clustering method used: Ward-linkage, squared Euclidean distance: adapted from Lenz & Nobis (2007).

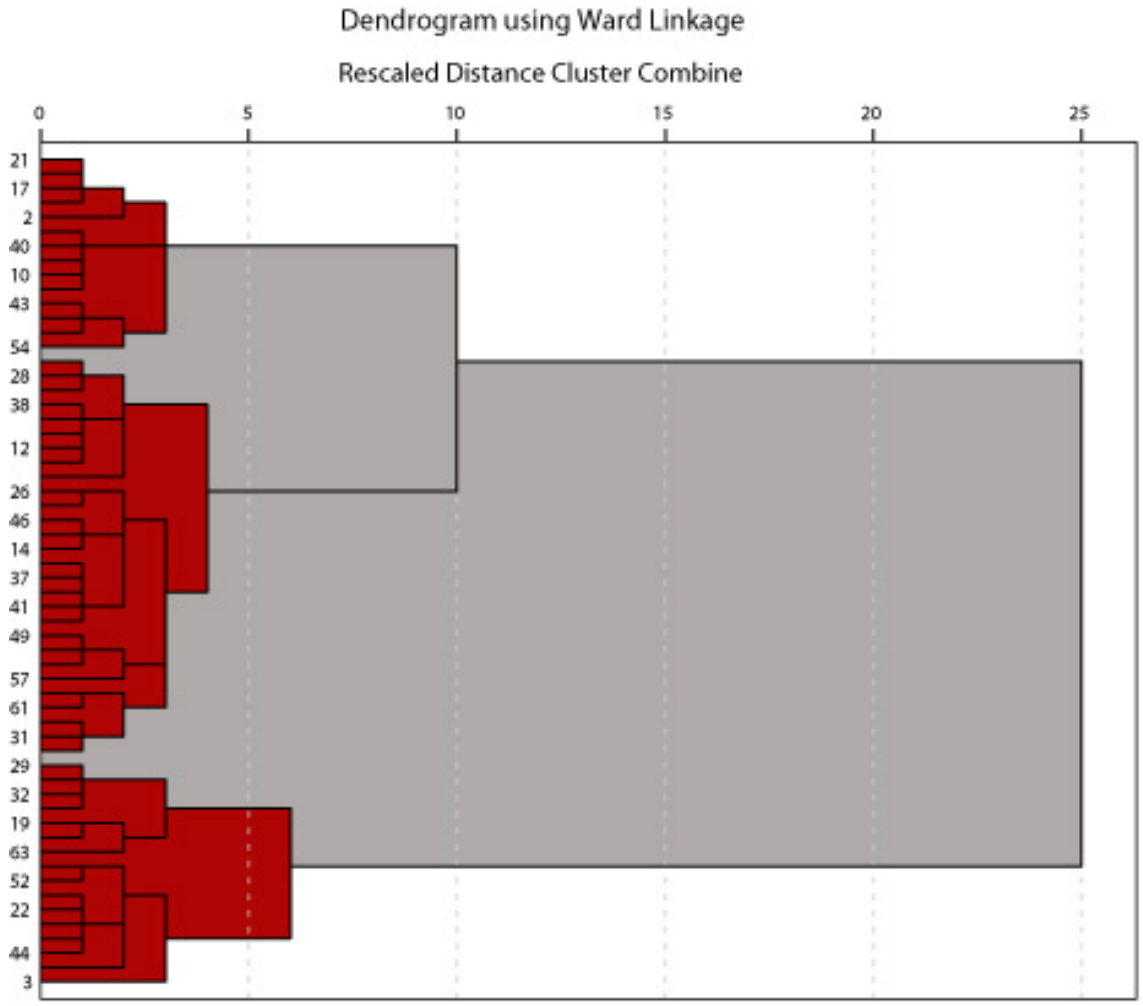

Figure 19. Dendrogram used to identify the three main clusters.

The results of this first analysis were compared by a K-means-clustering using three clusters. As few of the cases changed clusters, three groups proved to be robust for the input variables chosen (Lenz & Nobis 2007). The variables that contributed to differentiating the clusters are given in Table 7. Neither the frequency of going to hotspots nor the use of the telephone for surfing the Internet contributed in determining the clusters. As discussed previously, most of the respondents went to hotspots at least once to several times a week (49/63) and only ten respondents of the sixty-three access the Internet using their cell phone.

Table 7. Variables contributing to the differentiation between clusters of WiFi users.

Variable	Cluster number			
	1 (*Local relaxers*) (n=17)	**2** (*Urban mobiles*) (n=30)	**3** (*Suburban parents*) (n=16)	**Chi-Square**
Frequently travels by car				χ^2=26.266, df=8,
Every day	6	3	**11**	ρ=0.001 Cramer-V: 0.489
1 to several times a week	2	14	**1**	
1 to several times a month	2	7	**0**	
1 to several times a year	2	2	**1**	
Never	2	2	**0**	
Frequently travel by public transport				χ^2=19.230, df=8,
Every day				ρ=0.000 Cramer-V: 0.407
1 to several times a week	5	**9**	1	
1 to several times a month	2	**13**	1	
1 to several times a year	1	**2**	2	
Never	6	**3**	7	
	2	**1**	3	
Frequently walks				χ^2=23.155, df=8,
Every day	**7**	**22**	1	ρ=0.003 Cramer-V: 0.455
1 to several times a week	**4**	**5**	5	
1 to several times a month	**2**	**0**	4	
1 to several times a year	**2**	**1**	2	
Never	**0**	**0**	1	
Arrives to hotspots on foot	8	**23**	1	χ^2=20.832, df=2, ρ=0.000 Cramer-V: 0.575
Arrives to hotspots by public transport	6	**17**	2	χ^2=8.691, df=2, ρ=0.013 Cramer-V: 0.371
Arrives to hotspots by car	8	7	**15**	χ^2=20.746, df=2, ρ=0.000 Cramer-V: 0.574
Frequency of working at home				
One to several times a day	0	**11**	**6**	χ^2=63.209, df=10,
One to several times a week	0	**10**	**6**	ρ=0.000 Cramer-V: 0.708
One to several times a month	1	**4**	**4**	
One to several times a year	1	**0**	**0**	
Never	15	**0**	**0**	
N/A	0	**5**	**0**	
Conducts work-related activities at hotspots	4	**25**	**11**	χ^2=19.181, df=2, ρ=0.000 Cramer-V: 0.561
Number of cars available during the week				χ^2=21.163, df=6, ρ=0.002 Cramer-V: 0.413
0 Cars	7	11	**0**	
1 Car	7	17	**7**	
2 Cars	2	1	**7**	
3+ Cars	1	0	**2**	
Number of cars available on the weekend				χ^2=29.213, df=6, ρ=0.000 Cramer-V: 0.485
0 Cars	5	4	**0**	
1 Car	8	24	**5**	
2 Cars	2	1	**9**	
3+ Cars	2	0	**2**	

After crossing the three clusters with other variables collected by the survey, the three profiles were named according to their characteristic qualities: *Local Relaxers* (n=17), *Urban Mobiles* (n=30) and *Suburban Parents* (n=16). Several variables were consistent across groups. The laptop is the dominant device used for connecting to the Internet and the use of social media is relatively consistent across each group. Each group is described according the characteristics that differentiate it from the other two groups. While not every member of each group perfectly fits the profile given, the clusters aid in revealing recurring trends.

For *Local Relaxers*, WiFi hotspots are often close to home and are used primarily for recreational purposes. In fact, nearly all (13/17) members of this group do not perform work-related tasks at hotspots, although only 11 are either full time or part time workers. This group includes a bus driver, a security guard, a political advisor, a foreman, several students (4/17), retirees (2/17) and a veterinarian. It is the nature of these jobs that may explain why only two (2/17) of them rarely[43] work at home. Among those who gave the postal codes for their place of residence and employment (12/17), ten either live or work within the inner-city neighborhoods of Limoilou, Saint-Roch, Old Quebec or Faubourg Saint-Jean-Baptiste[44]. It is not surprising that the members of this group walk most often (10/17), although they do use the car (8/10) to travel to hotspots as often as they walk (8/10).

The fact that the most important qualities for this first subgroup in choosing the hotspot are its proximity to the place of residence, the availability of places to sit and the speed of the Internet could suggest that the users do not have Internet access at home. However, only four respondents seem to not have Internet access at home[45], which means that accessing the Internet was not the primary reason for visiting WiFi hotspots. Open-ended comments on the benefit of WiFi suggest that they simply enjoy being able to communicate with others and access information no matter where they are in the city.

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[43] One respondent works at home one to several times a month and another works at home one to several times a year.

[44] Of the remaining two, one lives in Saint-Bonaventure and the other lives on the western edge of Sainte-Foy.

[45] This question was not asked directly. Crossing related variables revealed that seven respondents *might* not have Internet access at home, but not having access was not as easy to confirm as having access.

For example, a part-time worker (male, 35-44 years) frequents the various bars and cafés in his neighborhood one to several times a week to use wireless Internet, despite subscribing to high-speed Internet at home. He has several hotspots that he frequents, including a bar, a library and café where he spends one to two hours chatting online, writing emails and searching for information, all for personal reasons. The bar is his favorite. He tends to go there weekday and weekend mornings and evenings after 5pm. These are also places where he meets up with friends and sometimes arrives with them. While he uses different modes of transport for other hotspots, his favorite is within walking distance of his house.

While the *Local Relaxers* access WiFi in public and semi-public places for mostly recreational reasons, *Urban Mobiles* incorporate both the WiFi hotspot and their home into mobile work practices. While this group contains both workers (17/30) and students (17/30), the profiles of each overlapped enough that it did not seem necessary to separate them into two groups. The professional profiles of the workers—entrepreneur, teacher, manager, research professional and IT technician, among others—offer a work flexibility that resembles that of students more than the typical 9 to 5 worker. The members of this group work at home (including for studies) anywhere from several times a day to several times a week.

Unlike the overall sample, which is 2/3 male, the *Urban Mobiles* are the one group where men (16/30) and women (14/30) are almost equally represented (although there are a larger number of women in the younger age groups[46]), showing that this is not a predominantly male phenomenon. They are singles (11/30) and couples (19/30) mostly without children (19/30). As urban neighborhoods are typically home to singles and couples without children (Morin & Fortin 2008), it is not surprising that among the members of this group who gave their postal code (15/30), 13 live in urban neighborhoods[47]. Living in an urban environment may be the reason why this group uses public transport the most often among the three clusters. They are also the most mobile with their devices. Throughout the sample, the number of different places where ICT were used is positively associated with the number of transport modes used[48]. Given that this group is the most

[46] 10 of the 14 members of the 18-24 and 25-34 age groups in the *Urban WiFi mobiles* are women.
[47] Meaning the bus route they live near runs at a frequency of at least fifteen minutes between arrivals. The most frequent bus Quebec City runs every five minutes.
[48] Chi-Square: χ^2=10.291, df=1, ρ=0.001

multimodal of all groups[49], it is not surprising that they use ICT devices (MP3 players, laptop computers, cell phones, etc) in the greatest number of places (average of 4/6 total places), like buses, bus stops, train stations or airplanes. They frequent hotspots mostly for their ambiance for anywhere from one hour to four hours. They chat, listen to music, search for information and read and write emails. More than three quarters of them (25/30) conduct activities related to their work (16/25) or studies (9/25). They are also more likely than the other groups to use a variety of trip-planning tools with WiFi while out and about[50].

A professor and researcher serves as an example of an *Urban Mobile*. She lives in one of the downtown neighborhoods and works within a 23-minute walking distance of her place of work[51]. This 35-44 year old lives with two children under the age of twelve and a partner who does not currently work[52], but who makes use of the car during the day. This respondent's favorite hotspots are libraries near her home and her place of work. In fact, she appears to use WiFi to get work done away from work, in order to complete tasks that require concentration on her laptop computer or netbook. While this *Urban Mobile* spends anywhere from 30 minutes to 4 hours at hotspots, she does not spend the whole time online. It is the ability to keep in contact electronically with her colleagues that allows her to get out of the office and work remotely. Email is the only way to reach her when she's there—she voluntarily has no cell phone. Work is brought home one to several times a day, although she is trying to stop working at home as she no longer has a dedicated place to work at her house.

She has more children than the average member of her cluster where households with children represent about a third (11/30) of the group. In this way, she is an urban version of the third group, *Suburban Parents*. What differentiates this latter group, however, is the nature of the WiFi use and its relationship to the children's activities. This

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[49] Multimodal is used here to mean that the respondent regularly travels with more than one mode of transport (excluding walking). An example includes someone who uses public transport every day, rides their bike one to several times a week, takes an interregional bus one to several times a month and carpools or using a carsharing service one to several times a year.

[50] 17 of the 30 *Urban WiFi mobiles* use trip planning tools like Trajecto and GoogleMaps to plan their trips while at hotspots or while traveling, compared to 5/17 among the *Leisure WiFi relaxers* and 5/16 among the *Suburban WiFi parents*.

[51] calculated using GoogleMaps and the postal codes of this respondent's place of work and place of residence.

[52] it is not clear if this partner is unemployed, although the partner has possession of the car during the week and may be caring for the children.

group is mostly composed of individuals who live in a Quebec suburban or exurban area and who travel most often (15/16) by car. Most live with a partner (15/16) and 11 out of 16 have two or more children or, in one case, only one child. In this group, as in the overall sample, men outnumber women more than two (11/16) to one (5/16). Fourteen respondents in this group are workers—for example, an engineer, an IT analyst, a pedagogical advisor and a consultant.

Suburban Parents visit hotspots one to several times a week, which is less often than *Urban Mobiles*, but about half of them indicated that they frequented a hotspot because their children have activities there[53], whether at a school during evening classes or at an indoor ice rink. The nature of this group's WiFi use can be characterized as productively using waiting time. This is one of the main reasons respondents said they were using WiFi and it just so happens that this behavior is most prevalent among members of this group. Their WiFi use fits into preexisting uses of the metropolitan area. This subgroup comprises the highest number of individuals who conduct work-related activities at hotspots. If mobile devices and WiFi allow those individuals who are waiting for their children to spend this time wisely, it is mostly spent getting work done.

For example, an IT analyst between the age of 35 and 44 lives in a northern suburb of Quebec City with his partner and three children. His WiFi hotspots are two ice rinks where his children have activities on the week nights and during the morning and afternoon on weekends. A third rink would also be on this list, if it offered free wireless Internet access. He spends his time checking email and searching for information, both for work and pleasure on his laptop. As his work schedule does not vary at all on a daily basis, his use of hotspots follows the schedule of his children's activities. None are close enough to be frequented by anything but the car. Besides, making the trip with his children and their hockey equipment is all but impossible by any other transport mode.

These three profiles show the different ways that the Quebec City WiFi users in this sample take advantage of free wireless Internet access provided in public and semi-public places. WiFi use is integrated into an overarching scenario of everyday life. Knowing how WiFi is being used aids in developing strategies for its implementation for different aims.

[53] This was not a choice originally in the survey, but 6 people total wrote in that their children had activities at the places where they used WiFi and 5 of these 6 fell into the *Suburban WiFi parents* cluster.

But what about the design of these places? What makes one hotspot more interesting than another? The server data analysis shows that the most frequented places are typically found near mixed-use commercial streets not far from residential neighborhoods. Can anything be said of the architecture of these places? The following section investigates the design and layout of hotspots in various parts of the city.

4.3 Towards a socio-spatial configuration of WiFi hotspots

This research project has attempted to investigate the relationship between WiFi hotspots as specific physical places in the built environment and WiFi users as nomads who alight in these physical places and conduct online and offline activities. From the results of the Internet survey, the use of WiFi in public and semi-public places can be understood as part of a larger desire to remain connected to sources of information and distant others[54]. The use of hotspots appears to insert itself into the daily and weekly rhythms of the WiFi users who frequent them. The server data reveals that the use of hotspots is geographically embedded and is not evenly distributed. Certain places are frequented more often than others, even if access to the Internet is provided in each of them.

There is perhaps something about these most popular hotspots that extends beyond wireless Internet access. Several WiFi users frequent their favorite hotspots because of the "ambiance" (24/56), although the notion of ambiance from the perspective of environmental design is too vague to be able to be utilized elsewhere. Ambiance can be approached as physical ambiance, which can be measured quantitatively in terms of temperature, acoustics or lighting (Amphoux et al 2004; Chelkoff & Thibaud 1992), but this research project chose to address ambiance qualitatively, as the result of relationships between spatial elements. In order to look at spatial configuration from a relational, qualitative standpoint, this portion of the research project referred to the pattern language developed by Christopher Alexander and his colleagues in the 1970s (Alexander *et al*. 1977; Alexander 1979).

This investigation was conducted by visiting several of the most popular hotspots in the different neighborhoods having the highest concentrations of hotspots. Mapping the hotspots according to popularity had revealed four neighborhoods where WiFi use was the highest: Old Quebec, Faubourg Saint-Jean-Baptiste, St-Roch and Limoilou (see Section

[54] A phenomenon that has been corroborated elsewhere (Gupta 2004; Forlano 2008).

4.1, Table 4). The types of places to visit were determined by crossing the types of hotspots most frequented by the three WiFi user profiles and the types of places that fell into the ZAP Québec server data's top quartile of most frequented places (Table 8). Other than the high number of ice rinks frequented by the *Suburban Parents* group, the proportion of types of hotspots visited by the Internet survey respondents is similar to that recorded by the server data for the top quartile of hotspots for all users of the network since 2006. Consequently, the final list of places to be visited was a selection of cafés, restaurants/bars and libraries in the four different neighborhoods (Table 9). In order to make a comparison with a popular hotspot located in a non-urban context, the Étienne-Parent library was included in the analysis[55].

Table 8. Types of hotspots frequented by WiFi user groups and by users in general*

Hotspot Type	**Types of hotspots frequented by group**			**Top quartile of server data (n=38)**
	Local Relaxers (n=17)	Urban Mobiles (n=30)	Suburban Parents (n=16)	
Café/Restaurant/Bar	14	11	10	19
Community/Athletic Center	3	3	1	1
Library	5	6	7	4
Outdoor Park & Public Places	6	5	3	5
Hockey Arena			5	
Tourism/Hospitality	1			
Schools		2	1	4
Theater & Cinema		1	1	2
Other	1	2	1	3
Total	30	30	29	38

*using server data for the extent of the WiFi network since 2006.

[55] It was also the only hotspot among the top ten to be located in an area accessible almost exclusively by automobile (public transport serves the area only on the half hour and on the hour during weekdays).

Table 9. Hotspots visited as part of the spatial analysis

Name of Hotspot	Type	Location
Pub d'Orsay	Bar / Restaurant	Old Quebec
Au Bonnet d'Âne	Bar / Restaurant	Saint-Jean-Baptiste
Gabrielle-Roy Library	Library	Saint-Roch
Brûlerie Saint-Roch	Café	Saint-Roch
Pub Galway	Bar / Restaurant	Montcalm
Le Bal du Lézard	Bar	Limoilou
La Fournée BIO	Café / Bakery	Limoilou
Café Nagua	Café	Limoilou
Étienne-Parent Library	Library	Beauport

As discussed in Section 3.3 (Table 2), a selection of 41 patterns was chosen from Alexander's (1977) 253. The presence of these patterns was verified through visits that lasted anywhere from thirty minutes to two hours. After the first several visits, the list of patterns to be verified was reduced significantly, as it became clear that certain spatial configurations made no difference in the overall ambiance of the space. For example, the quality of lighting was best described by the amount of daylight that penetrated into the space (corresponding to the pattern WINGS OF LIGHT[56]) rather than the amount of sunlight (INDOOR SUNLIGHT). If there was direct sunlight, it would need to be filtered (FILTERED LIGHT) in order to reduce glare or overheating of the space. Nor did the cardinal orientation of these spaces seem to make a difference in their popularity. Not all face south and for those that did, the space was not used if it there was not sufficient protection from the sun, which is particularly important when trying to read the screen of a mobile device. Narrowing down the patterns in this way produced a shorter list of patterns which were then tallied (Table 10), revealing five core patterns that appeared in over two-thirds of the hotspots visited. It is interesting to note that the patterns forming the core of what could be called the *pattern language of being online in public* come from only three of the eight groups into which the patterns were classified: 1) patterns that connect inside and outside; 2) patterns that attract people; and 3) patterns that create places for people to be together.

[56] Alexander's (1977) patterns are written here in capital letters, similar to in *A Pattern Language*.

Table 10. Final list of patterns with most frequent in bold.

	WINGS OF LIGHT	**POSITIVE OUTDOOR SPACE**	PRIVATE TERRACE	**WINDOWS OVERLOOKING LIFE**	LOW SILL	**MAIN ENTRANCE**	PEDESTRIAN DENSITY	**ACTIVITY POCKETS**	**COMMON AREAS AT THE HEART**
Pub d'Orsay		X		X	X	X	X	X	X
Au Bonnet d'Âne	X	X	X	X	X	X	X	X	X
Gabrielle-Roy Library				X		X	X	X	X
Brûlerie St-Roch	X	X		X	X	X	X	X	X
Pub Galway		X	X	X	X	X	X	X	X
Le Bal du Lézard		X	X	X		X	X	X	X
La Fournée BIO	X	X	X	X	X	X			X
Café Nagua	X	X	X	X		X			X
Étienne Parent	X	X		X	X	X		X	
TOTAL	5	**8**	5	**9**	6	**9**	6	**7**	**8**

The pattern language of "being online in the presence of others" appears to revolve around five primary patterns: ACTIVITY POCKETS, WINDOWS OVERLOOKING LIFE, POSITIVE OUTDOOR SPACE, COMMON AREAS AT THE HEART and MAIN ENTRANCE. The combination of these elements creates a situation where mobile device users become spectators of an outdoor environment or of an indoor activity (Figure 20). The WiFi user (Figure 20, B) has a privileged position adjacent to such activities. Large windows offer a view of outdoor activities (WINDOWS OVERLOOKING LIFE) occurring in public gathering places, such as markets or commercial streets with high pedestrian density (Figure 20, C2) (ACTIVITY POCKETS). At Pub Galway, this relationship is well illustrated by the floor to ceiling windows that offer WiFi users (and of course non-users) a view of busy street life (Figure 21). While in an urban context, the popular hotspots frequently look upon an area of human activity, in the case of Étienne-Parent situated off a limited access highway between two suburban power centers, large windows look out upon a sunny landscape (Figure 20, C1) (POSITIVE OUTDOOR SPACE) (Figure 22).

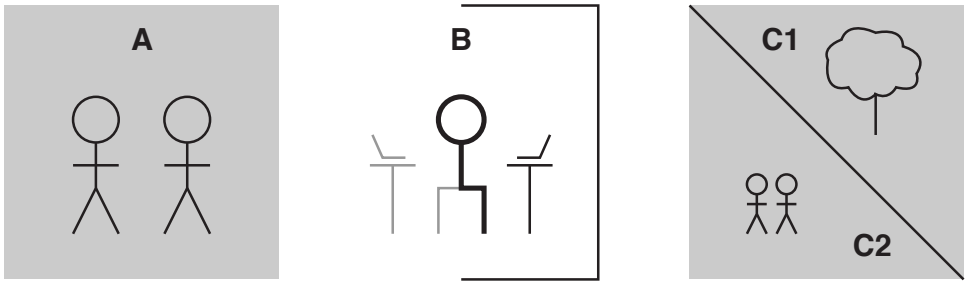

Figure 20. Diagrammatic representation of "being online in the presence of others"

WiFi users can also be spectators of interior activities, situated within the center of the hotspot space (COMMON AREAS AT THE HEART) (Figure 20, A). At the Gabrielle-Roy library, the interior atrium offers a generous view of interior circulation spaces (Figure 23), although the tables with outlets are mostly located by the windows (Figure 24). At ice rinks, this relationship between spectator and activity is similar, but occurs in a different context. *Suburban Parents* use WiFi at ice rinks during their children's activities and would probably not be there otherwise. In this instance, "being online in the presence of others" is simply "passing the time" rather than purposefully "being alone in public" (see Gupta 2004 for discussion of this latter). This is a situation that can be compared with public transportation use, where individuals "cocoon" more than "camp" (Ito *et al*. 2009).

As indicated through mapping the ZAP Québec server data, the most frequented hotspots are often located near places where people linger. In this way, attracting patrons not only involves generous views from the inside to the outside, but a main entrance that announces its presence to the street (MAIN ENTRANCE). It is therefore not surprising that of the eight urban hotspots analyzed, six are situated on a street corner[57]. Café Nagua calls attention to itself with its prominent stoop and portico (Figure 25), while for the Brûlerie St-Roch, laptop users can be seen by passersby (Figure 26). For other hotspots located in the middle of street blocks, terraces (another form of POSITIVE OUTDOOR SPACE) encourage pedestrians to enter by presenting a transition space between the street and the hotspot (Figures 27-28).

[57] The Gabrielle-Roy library occupies almost an entire street block.

Figure 21. With its large windows, Pub Galway offers a view of the activity of Avenue Cartier (photo by author).

Figure 22. Most WiFi users were observed in this area at the Étienne-Parent Library, where large tables are placed next to northeast facing windows (photo by author).

Figure 23. The atrium at Gabrielle-Roy is a source of daylight and a central circulation space, offering views of several floors (photo by author).

Figure 24. The most popular area at Gabrielle-Roy for WiFi use (photo by author).

Figure 25. Café Nagua in Limoilou announces its presence with a large portico and seasonal terrace. Source: Google Streetview.

Figure 26. The Brûlerie St-Roch places a bar-style table at the window for patrons to watch passersby. Source: Google Streetview.

Figure 27. The large outdoor terrace of the Bal du Lézard bar in Limoilou.

Source: Google Streetview

Figure 28. In the summer, Pub Galway opens its large windows and terrace (photo by author).

The use of the *Pattern Language* served to identify the most common spatial relationships across the various hotspots. While there is no single way of designing hotspots, this exploratory analysis suggests that the best practices are found in places that are next to places where people gather, as a continuity of public space. This can be provided physically, with a street terrace for example, or simply with a view to a larger activity. The relationship can also occur entirely on the inside, with views of a generous (and populated) atrium space. Hotspots offer WiFi users a place to be spectators of human activity. The trends observed can serve as an inspiration in designing future places where mediated activities merge with physical ones. Whether such trends are universal or are unique to Quebec City will have to be investigated by future studies. The following and final chapter discusses the implications of the findings of this thesis and directions for further research.

5.0 Conclusion

This research project set out to investigate how public and semi-public places are being reinvented through mobile technologies and wireless Internet. The literature reviewed in establishing its theoretical and empirical foundations suggested that mobile information and communication technologies (ICT) influence the relationship of people to the built environment and structure their use of it. Discussion of the environments in which this use occurs, however, was almost nonexistent. While architecture as a profession has always taken a position on technological progress (cf. Braham & Hale 2007), it tends to neglect certain technologies when conceiving spaces in favor of those that achieve desired technical (reduced energy consumption) or aesthetic (multimedia walls) effects. "Invisible" technologies like wireless Internet (WiFi) are viewed as anecdotal, if they are addressed at all. But if new ways of using space are emerging out of ICT use and particularly through mobile technologies and WiFi, architects should be studying these phenomena more closely.

In order to explore design implications for ICT use, this research project targeted a particular phenomenon: the use of wireless Internet access in public and semi-public places. Although technology use is prevalent in the home and workplace, the number of activities able to be conducted outside of these two places with ICT is relatively recent. Public and semi-public places are also not historically the main places for ICT use. The domestication of this latter has in fact been blamed for a loss of interest in public and semi-public places (Putnam 2000; Oldenburg 1989). If WiFi can "reactivate" (Mitchell 2003) public and semi-public places, it will reinvent them as well. New practices clash with old. This is perhaps why the presence of WiFi and WiFi users in cafés has inspired such a heated discussion.

At the start of this study in 2008, the ZAP Québec network of wireless hotspots in Quebec City had been expanding since 2006. The presence of nearly 150 hotspots gave WiFi users a number of places where they could access the Internet. The fact that some of these places were frequented more often than others inspired an investigation into the elements of the built environment that made one hotspot more popular than the other. Through an analysis of server data recording hotspot usage from 2006 through the beginning of 2010, an Internet survey conducted among WiFi users as well as through a

comparison of several of the most popular hotspots themselves, the project found that there are indeed certain trends in WiFi popularity that could serve in guiding WiFi implementation and hotspot design.

As in all studies, this project has its limitations. The small sample size of sixty-three respondents can not be used to generalize about WiFi users in Quebec City. Furthermore, the respondents of the Internet survey live mostly in urban areas of a city whose over 700,000 residents occupy a 500 square kilometer metropolitan region. The project still has several strengths, notably the glimpse it offers of two emerging WiFi user groups, the *Suburban parents* and *Local relaxers*. More families with young children now live in the suburbs than in the city, suggesting that this user group may be on the rise. The latter group, *Local relaxers*, contains many early baby-boomer retirees, a group that census statistics predict will increase in number in Quebec City (as elsewhere) in the next decade (Morin & Fortin 2008).

The results of the Internet survey show that designing for mobile activities does not mean designing for one user profile. The three groups discussed in Section 4.2.5 include men and women, workers and students, of various ages and socio-economic backgrounds. Some use WiFi for leisure while others use it to get work done. The hotspot can either be a place chosen to carry out mediated activities, or simply a place to kill time. Whether WiFi users are still a marginal group or not, mobile device ownership and wireless Internet use are on the rise both in Quebec (CEFRIO 2010) and in the United States (Hampton *et al.* 2009). As newer mobile technologies come on to the market and 3G and 4G cell phone networks become more widespread, the number of ways of being online in the presence of others will only increase.

In response to arguments that ICT use homogenizes the experience of space, this Master's thesis attempts to show evidence of the contrary. The "anytime, anywhere" rhetoric of mobile communications companies was already shown to be wishful thinking both in terms of the affordances of the technology and the actual habits of the users (Forlano 2008). Where the hotspot is located seems to make a difference in its level of use, shown here in Quebec City and corroborated by studies performed a decade apart in California, a hub for mobile technology incubation (Afanasyev *et al*. 2008; Tang & Baker 2002). The WiFi users surveyed choose hotspots that are in or around the centers of

action, where people come together. Sometimes these places are near the home or workplace, other times they are in another part of town entirely.

The fact that ICT contribute to a "further decline in the difference between here and there" is nothing new (Meyrowitz 1985, p. 328), but 'here' and 'there' have not become indistinguishable. Even if an activity can be performed as easily in space A as in space B, this does not imply that the experience of doing that activity will be the same in one as in the other. To use Kakihara's (2003) terminology, as *interactional* (with whom) and *organizational* (with what) constraints are relaxed, the *locational* aspect (where) takes on greater importance and is subjected to other criteria. Someone who can work at home may decide to go to a neighborhood café not only because they *can*, but because the café provides both a positive ambiance and enables them to concentrate on their work.

William Mitchell (2007, orig. 2002) refers to this reassessment of location constraints as the "revenge of place" (p. 428). As debates surrounding WiFi use in coffee shops suggest, however, 'place' is coming back in ways that rupture with the conceptions of public and semi-public places as "third places" (Oldenburg 1989). As public and private are now mobile (Sheller & Urry 2003), the first and second places of the home and workplace are no longer confined to the place of work and of residence. Third places are becoming as much places of work as homes are becoming places to escape domestic life and connect with virtually co-present strangers or colleagues. Research into office design is taking note of this, integrating the comforts of home and the social atmosphere of a café into some workplaces (Pélégrin-Genel 2007; Grech & Walters 2008).

The conflict put forth by Manuel Castells (2000, 2007, orig. 2004) between the 'space of places' and the 'space of flows' can be approached here as the need to reconcile the meaningful situated interactions of places with their presence as nodes in a larger network of spaces both near and far. People "carry flows and move across places" (2007, orig. 2004: p. 448). The challenge that architects and urban planners will face in the twenty-first century is how to design places as meaningful nodes in larger networks—to create places for mobile activities to alight, for them to converge. WiFi hotspots are examples of how such nodes are developing almost vernacularly. Mobile activities converge upon them both because they can and because they offer people a feeling of liberty of movement, as evidenced by this project.

Further research is necessary for architects and urban planners to be able to approach mobile activities as a design opportunity. Information and communication technologies allow people to remain connected while in movement and to connect and disconnect with the places they cross (Abbas 2006, Ito *et al*. 2009). While the manifestations of these emerging mobilities are beginning to attract interest (Abbas 2006, Kakihara 2003, Kesselring & Vogl 2008), they do not give us enough information on the nature of the places that these 'pioneers of mobility' inhabit, nor do they explore how these changes are occurring across less exceptional portions of the population.

Such research would have to begin by developing an understanding how the space of flows and the space of places are experienced on an individual basis, as networks of places connected through physical travel, other people and sources of information. These networks can contain places on many different scales, from the local grocery store to a favorite vacation spot on the other side of the world. Studies looking at transport mode use could serve as a reference, as they typically focus on creating such place networks to understand their role in structuring daily mobility (Flamm 2004). The meaning given to such places would also be of interest, considering that place attachment is increasingly ephemeral (Abbas 2006) and crosses national and cultural boundaries (Gustafson 2001). Social networks will play a part, as they are important in constructing one's relationship to local and distant places (Urry 2007, Wellman 2002). Sources of information, in addition to people, provide connections to other places on local and global scales.

These explorations could look at how ICT and transportation modes go hand-in-hand in connecting to other people and places. The effects of ICT use on mode choice were hardly addressed by the studies in the literature review. While the automobile may be the default mode for people whose hectic lives induce ICT use (Lenz & Nobis 2007), forms of flexible working can be used to better appropriate collective modes of transport (Vincent 2008). The mobile phone can allow automobile users to make on the fly decisions about where to make stops (Srinivasan & Raghavender 2006), moving about the city in ways that would be impossible by public transport (Hensher & Reyes 2000; Ye *et al.* 2007). At the same time, however, mobile devices allow people to take advantage of travel periods (Axtell *et al.* 2008; Kenyon & Lyons 2007; Lyons *et al.* 2007; Ohmori & Harato 2008) and acquire personalized information about route schedules and paths (Jain 2006; Thackara 2005) changing perceptions as to the utility of time spent in public

transport and the facility by which the transport network can be comprehended. The increasing individuality of such territorial experiences (Montulet & Hubert 2008) and the coupling of transportation and ICT (Kesselring & Vogl 2008) merit a series of transdiciplinary qualitative studies.

With a general understanding of how social, information and transportation networks are changing the ways people develop a relationship with places, architects will have to question the ability of current building typologies to respond to new social and cultural realities. Libraries, for example, have had to adapt to become as much places for collective knowledge sharing as individual knowledge consultation (Khan 2009), given the number of places outside the library where the same amount of information can be accessed. Office places are another example. Research is revising the office layout in order to reflect employee mobility, reducing the office to a place for social exchange and face-to-face collaborative work (Harrison *et al*. 2004). The workplace is no longer confined to the walls of the office (Duffy 2008, OGC & DEGW 2008).

Evaluating building typologies would answer the following questions: For what activity or group of activities has this building type been formed? What was the social and cultural context at its origin? Have society's ways of conducting the same activity changed since the typology's inception? What other, complementary activities are associated with this building typology? Do they always have to remain separate or could their combination lead to a new typology? How do people conduct these same activities remotely and what motivates their desire to perform these latter in a particular place? Just as the café's ability to attract workers raises research questions, it could also be asked what attracts individuals to grocery stores, when fresh fruits and vegetables can now to be delivered to the door step.

As the use of wireless Internet in public and semi-public places suggests, there is something fundamental in wanting to be online in the presence of others. Whether it "eases the disconnect with the local" that living in a networked world creates (Varnelis & Friedberg 2008, p 20) or simply satisfies the desires of an inherently social, nomadic being, architects and urban planners will remain responsible for creating the places where such re-connections occur. Without an understanding of how places are being redefined at the turn of the twenty-first century, architecture and urban planning will remain

symptomatic of the Network Society, rather than choreographers of it. Flows will cross, but they will never come together.

Bibliography

Abbas, Y. (2006). *Neo-nomads: Designing Environments for Living in the Age of Mental, Physical and Digital Mobilities.* Dissertation. Harvard University, Boston.

Afanasyev, M., Chen, T., Voelker, G. M., & Snoeren, A. C. (2008). *Analysis of a Mixed-Use Urban WiFi Network: When Metropolitan becomes Neapolitan*. Proceedings from IMC '08: Proceedings of the 8th ACM SIGCOMM conference on Internet measurement, New York, NY.

Alexander, C. (1977). *A pattern language : towns, buildings, construction.* New York: Oxford University Press.

Alexander, C. (1979). *The timeless way of building.* New York: Oxford University Press.

Amin, A., & Thrift, N. (2002). *Cities: Reimagining the Urban.* Malden: Blackwell Publishers Limited.

Amphoux, P., Thibaud, J.-P., & Chelkoff, G. (Eds.). (2004). *Ambiances en débats.* Bernin (Isère): A la croisée.

Axtell, C., Hislop, D., & Whittaker, S. (2008). Mobile technologies in mobile spaces: Findings from the context of train travel. *International Journal of Human-Computer Studies*, *66*(2), 902-915.

Bauman, Z. (2000). *Liquid modernity.* Cambridge Malden, MA: Polity Press Blackwell.

Benkler, Y. (2006). *The Wealth of Networks: How Social Production Transforms Markets and Freedom.* Yale University Press.

Bentley, I. (1987). *Responsive environments : a manual for designers.* London: Butterworth-Architecture.

Boboc, A., Dhaleine, L., & Mallard, A. (2007). Travailler, se déplacer et communiquer: premiers résultats d'enquête. *Réseaux*, *2007*(1), 133-158.

Braham, W. W., & Hale, J. A. (Eds.). (2007). *Rethinking Technology: A Reader in Architectural Theory.* New York: Routledge.

Brown, B., & O'Hara, K. (2003). Place as a practical concern of mobile workers. *Environment & Planning A*, *35*(9), 1565-1587.

Carpentier, S. (2007). Une analyse exploratoire des liens entre mobilité quotidienne et ancrage résidentiel. *Articulo - Revue de sciences humaines [online]*, *3*.

Castells, M. (2000). *The Rise of The Network Society* (Second ed.). Malden, MA: Blackwell Publishing.

Castells, M. (2008). Afterword. In J. E. Katz (Ed.), *Handbook of Mobile Communications Studies* (pp. 447-451). Cambridge: MIT Press.

Castells, M. (2007). Space of Flows, Space of Place: Materials for a Theory of Urbanism in

the Information Age [2004]. In W. W. Braham & J. A. Hale (Eds.), *Rethinking Technology: A Reader in Architectural Theory* (pp. 440-455). New York: Routledge.

CEFRIO. (2008). *NetQuébec 2008. Portrait de l'utilisation des TI et d'internet au Québec.* Québec: Le CEFRIO.

CEFRIO. (2010). *NETendances 2009: l'Utilisation d'Internet au Québec.* Quebec: CEFRIO.

CEFRIO. (2009). *Génération C: Les 12-24 ans - Moteurs de transformation des organisations (Research report).* Quebec: CEFRIO.

Chelkoff, G., & Thibaud, J.-P. (1992). L'espace public, modes sensibles : le regard sur la ville. *Les Annales de la recherche urbaine*, *57-58*, 7-16.

Couclelis, H. (1994). Spatial technologies. *Environment and Planning B*, *21*, 142-142.

Couclelis, H. (2000). From Sustainable Transportation to Sustainable Accessibility: Can We Avoid a New *Tragedy of the Commons?* In D. G. Janelle & D. C. Hodge (Eds.), *Information, Place, and Cyberspace. Issues in Accessibility* (pp. 341-356). New York: Springer.

Duffy, F. (2008). *Work and the city.* London: Black Dog.

Duhamel, A. (2009, April 11). Le bureau communautaire. *Les Affaires*, p. 13.

Élections Québec. (2008). Internet sans fil. Un nouvel enjeu électoral. *Élections Québec* Retrieved 13 dec, 2008, from http://elections.radio-canada.ca/elections/quebec2008/2008/.

Flamm, M. (2004). *Comprendre le choix modal : les déterminants des pratiques modales et des représentations individuelles des moyens de transport.* EPF Lausanne, Lausanne.

Florida, R. (2002). *The Rise of the Creative Class.* New York: Basic Books.

Florida, R. (2005). *Cities and the creative class.* New York: Routledge.

Forlano, L. (2008). *When Code Meets Place: Collaboration and Innovation at WiFi Hotspots.* Columbia University, New York.

Global Coworking Blog. (2010). About. Retrieved November 17, 2010, from http://blog.coworking.com/about/.

Graham, S. (1998). The end of geography or the explosion of place ? Conceptualizing space, place and information technology. *Progress in Human Geography*, *22*(2), 165-185.

Graham, S., & Marvin, S. (1996). *Telecommunications and the City: Electronic Spaces, Urban Places.* New York: Routledge.

Grech, C., & Walters, D. (Eds.). (2008). *Future office : design, practice, and applied research.* New York: Taylor & Francis Group.

Greeno, J. G. (1994). Gibson's Affordances. *Psychological Review*, *101*(2), 336-342.

Gupta, N. (2004). *Grande Wi-Fi: Understanding What Wi-Fi Users Are Doing in Coffee-Shops.* Unpublished Masters in Comparative Media Studies, Massachusetts Institute of Technology, Cambridge, MA.

Gustafson, P. (2001). *Place, Place Attachment and Mobility: Three Sociological Studies.* Göteborg University, Göteborg.

Hampton, K., Sessions, L., Her, E. J., & Rainie, L. (2009). *Social isolation and new media: how the internet and mobile phones impact Americans' social networks.* Washington, D.C.: Pew Internet & American Life Project.

Hampton, K. N., Livio, O., & Trachtenberg, C. (2008). *Is WiFi use compatible with public spaces?: Wireless Internet use, sociability and social networks*. Proceedings from Annual meeting of the International Communication Association, Montréal, Quebec, Canada: http://www.allacademic.com/meta/p230142_index.htm.

Harrison, A., Wheeler, P., & Whitehead, C. (Eds.). (2004). *The Distributed Workplace: Sustainable Work Environments.* New York: Spon Press.

Hensher, D. A., & Reyes, A. J. (2000). Trip chaining as a barrier to the propensity to use public transport. *Transportation*, *27*, 341-361.

Hislop, D. (2008). Introduction. In D. Hislop (Ed.), *Mobility and technology in the workplace* (pp. 1-12). New York: Routledge.

Hislop, D., & Axtell, C. (2009). To infinity and beyond?: workspace and the multi-location. *New Technology, Work and Employment*, *24*(1), 60-75.

Hjorthol, R., & Gripsrud, M. (2009). Home as a communication hub: the domestic use of ICT. *Journal of Transport Geography*, *17*(2), 115-123.

Ito, M., Okabe, D., & Anderson, K. (2009). Portable Objects in Three Global Cities: The Personalization of Urban Places. In R. Ling & S. Campbell (Eds.), *The Reconstruction of Space & Time through Mobile Communication Practices* (26 individuals (12 London; 8 Los Angeles; 6 Tokyo) ed.). Transaction Books.

Jain, J. (2006). Bypassing and WAPing: Reconfiguring Timetables for 'Real-time' Moblity. In M. Sheller & J. Urry (Eds.), *Mobile technologies of the city* (pp. 79-101). New York: Routledge.

Janelle, D. G. (1973). Measuring human extensibility in a shrinking world. *The Journal of Geography*, *72*(5), 8-15.

Johnson, L. C. (2003). *The co-workplace teleworking in the neighbourhood.* Vancouver, B.C: UBC Press.

Junestrand, S. (2001). *Being private and public at home: an architectural perspective on video mediated communication in smart homes.* Unpublished Dissertation, KTH: School of Architecture, Stockholm.

Junestrand, S., Keijer, U., & Tollmar, K. (2001). Private and public digital domestic spaces. *International Journal of Human-Computer Studies*, *54*, 753-778.

Kakihara, M. (2003). *Emerging Work Practices of ICT-Enabled Mobile Professionals.* London School of Economics, London.

Kaufmann, V. (2002). *Rethinking Mobility: Contemporary Sociology.* Burlington: Ashgate.

Kenyon, S., & Lyons, G. (2007). Introducing multitasking to the study of travel and ICT: Examining its extent and assessing its potential importance. *Transportation Research Part A: Policy and Practice*, *41*, 161-175.

Kesselring, S., & Vogl, G. (2008). Networks, Scapes and Flows -- Mobility Pioneers Between First and Second Modernity. In W. Canzler, V. Kaufmann, & S. Kesselring (Eds.), *Tracing Mobilities: Towards a Cosmopolitan Perspective* (pp. 163-180). Burlington: Ashgate Publishing Limited.

Khan, A. (2009). *Better by design : an introduction to planning and designing a new library building.* London: Facet Publishing.

Kwan, M. P. (2002). Time, Information Technologies and the Geographies of Everyday Life. *Urban Geography*, *23*(5), 471-482.

Laurier, E. (2002). Notes on dividing the attention of a car driver. *Team Ethno* Retrieved 14 April 2009, http://www.teamethno-online.org.uk/Issue1/Laurier/gooddriv.html.

Laurier, E. (2004). Doing Office Work on the Motorway. *Theory, Culture & Society*, *21*, 261-277.

Law, J. (1992). Notes on the Actor-Network: Ordering, Strategy, and Heterogeneity. *Systems Practice and Action Research*, *5*(4), 379-393.

Lee-Gosselin, M., & Miranda-Moreno, L. F. (2009). What is different about urban activities of those with access to ICTs? Some early evidence from Quebec, Canada. *Journal of Transport Geography*. 17(2) 104-114.

Lenz, B., & Nobis, C. (2007). The changing allocation of activities in space and time by the use of ICT-- "Fragmentation" as a new concept and empirical results. *Transportation Research Part A: Policy and Practice*, *41*, 190-204.

Licoppe, C., Diminescu, D., Smoreda, Z., & Ziemlicki, C. (2008). Using mobile phone geolocalisation for 'socio-geographical' analysis of co-ordination, urban mobilities, and social integration patterns. *Tijdschrift voor Economische en Sociale Geografie*, *99*(5), 584-601.

Lyons, G., Jain, J., & Holley, D. (2007). The use of travel time by rail passengers in Great Britain. *Transportation Research Part A*, *41*(1), 107-120.

Meyrowitz, J. (1985). *No sense of place : the impact of electronic media on social behavior.* New York: Oxford University Press.

Mitchell, W. J. (2003). *Me++: The Cyborg Self and the Networked City.* Cambridge, MA:

MIT Press.

Mitchell, W. J. (2007). E-Bodies, E-Building, E-Cities [2002]. In W. W. Braham & J. A. Hale (Eds.), *Rethinking Technology: A Reader in Architectural Theory* (pp. 426-436). New York: Routledge.

Moati, P. (2005). Introduction. In P. Moati (Ed.), *Nouvelles technologies et modes de vie. Aliénation ou hypermodernité ?* (pp. 5-20). Éditions de l'aube.

Mohammed, G., & Thwaites, K. (2010). *The role of urban planning conventions in reforming urban spatial morphology within social sustainability: Exploration of a new analytical method of open spaces networks*. Proceedings from Vulnerability, Risk and Complexity: Impacts of Global Chang on Human Habitats (IAPS 21 Conferences, Abstracts of Presentations), Leipzig (Germany).

Mokhtarian, P. L. (2002). Telecommunications and Travel: The Case for Complementarity. *Journal of Industrial Ecology*, *6*(2), 43-57.

Montulet, B., & Hubert, M. (2008). Se déplacer avec des enfants à Bruxelles ? Une étude sociologique sur les vécus du temps et les usages des modes de transport. *Brussels Studies*, *15*.

Morin, D., & Fortin, A. (2008). Comment la vieille capitale est-elle devenu vieillissante? *Cahiers québécois de démographie*, *37*(1), 97-130.

Nicolaou, L. (2006). Emerging Building Forms and Accommodation Solutions: New Building Typologies or Distinctive Place-Making. In J. Worthington (Ed.), *Reinventing the workplace* (2nd ed., pp. 205-219). Burlington: Architectural Press.

Nielsen, P., & Fjuk, A. (2010). The Reality beyond the Hype: Mobile Internet is Primarily an Extension of PC-Based Internet. *The Info. Soc*, *26*(5), 375-382.

OGC, DEGW. (2008). *Working Beyond Walls. The Government Workplace as an Agent of Change.* London: Office of Government Commerce (OGC).

Ohmori, N., Hirano, T., & Harata, N. (2006). Meeting Appointment and Waiting Behavior with Mobile Communications. *Transportation Research Record*, *1977*(1), 250-257.

Ohmori, N., & Harata, N. (2008). How different are activities while commuting by train? A case in Tokyo. *Tijdschrift voor Economische en Sociale Geografie*, *99*(5), 547-561.

Oldenburg, R. (1989). *The great good place : cafés, coffee shops, community centers, beauty parlors, general stores, bars, hangouts, and how they get you through the day* (1st ed.). New York: Paragon House.

Pélegrin-Genel, E. (2006). *25 espaces de bureaux.* Paris: Le Moniteur.

Pew Internet & American Life Project. (2009). Mobile Internet use increases sharply in 2009 as more than half of all Americans have gotten online by some wireless means". Retrieved 29 November, 2010, from http://www.pewinternet.org/Press-Releases/2009/Mobile-internet-use.aspx.

Putnam, R. (2000). *Bowling alone : the collapse and revival of American community.* New York: Simon & Schuster.

Schwanen, T., & Kwan, M.-P. (2008). The Internet, mobile phone and space-time constraints. *Geoforum*, *39*, 1362-1377.

Sennett, R. (2005). Capitalism and the City. In S. Read, J. Rosemann, & J. v. Eldijk (Eds.), *Future city* (pp. 114-124). New York: Spon Press.

Sheller, M., & Urry, J. (2006). The New Mobilities Paradigm. *Environment and Planning A*, *38*(2), 207-226.

Sheller, M., & Urry, J. (2003). Mobile Transformations of 'Public' and 'Private' Life. *Theory, Culture & Society*, *20*(3), p107 - 125.

Srinivasan, K. K., & Athuru, S. R. (2004). Modelling Interaction Between Internet Communication and Travel Activities: Evidence from Bay Area, California, Travel Survey 2000. *Transportation Research Record: Journal of the Transportation Research Board*, *1894*, 230-240.

Srinivasan, K. K., & Raghavender, P. N. (2006). Impact of Mobile Phones on Travel: Empirical Analysis of Activity Chaining, Ridesharing and Virtual Shopping. *Transportation Research Record: Journal of the Transportation Research Board*, *1977*, 258-267.

Tang, D., & Baker, M. (2002). Analysis of a Metropolitan-Area Wireless Network. *Wireless Networks*, *8*, 107-120.

Thackara, J. (2005). *In the bubble : Designing in a complex world.* Cambridge, Mass.: MIT Press.

Therrien, Y. (2009). Subvention de 200 000 $ pour ZAP Québec. *Le Soleil* Retrieved 18-02-2009, http://www.cyberpresse.ca/le-soleil/actualites/science-et-technologie/200902/19/01-829203-subvention-de-200-000-pour-zap-quebec.php.

Thulin, E., & Vilhelmson, B. (2007). Mobiles everywhere: Youth, the mobile phone, and changes in everyday practice. *Young: Nordic Journal of Youth Research*, *15*(3), 235-253.

Townsend, A. M. (2003). *Wired/Unwired: The Urban Geography of Digital Networks.* Unpublished Unpublished doctoral dissertation, Massachusetts Institute of Technology, Boston.

Urry, J. (2007). *Mobilities.* Cambridge: Polity Press.

Varnelis, K., & Friedberg, A. (2008). Place: The Networking of Public Space. In K. Varnelis (Ed.), *Networked Publics* (pp. 15-42). Cambridge: The MIT Press.

Vincent, S. (2008). *Les « altermobilités » : analyse sociologique d'usages de déplacements alternatifs à la voiture individuelle. Des pratiques en émergence ?* Unpublished Dissertation Sociology, Université Paris 5 - René Descartes - Sorbonne, Paris.

Wang, D., & Law, F. Y. T. (2007). Impacts of Information and Communication Technologies (ICT) on time use and travel behavior: a structural equations analysis. *Transportation*, *34*(4), 513-527.

Wellman, B. (2002). Little boxes, glocalization, and networked individualism. *Digital cities II: Computational and sociological approaches,* 337-343.

Ye, S., Pendyala, R. M., & Gottardi, G. (2007). An exploration of the relationship between mode choice and complexity of trip chaining patterns. *Transportation Research Part B*, *41*, 96-113.

Zhang, F., Clifton, K. J., & Sheng, Q. (2007). Reexamining ICT impact on travel using the 2001 NHTS data for Baltimore Metropolitan Area. In H. J. Miller (Ed.), *Societies and Cities in the Age of Instant Access* (pp. 153-156). Springer.

Appendix A: Bivariate correlation tables

A.1 Individual and household (HH) variables

			Age	Gender	Education Level	HH Income	Does not have a partner	# of children in HH	Work schedule varies daily	Hours worked per day	Hours worked per week	Dedicated place to work at home	Frequency of working at home	# of cars avail. on a weekday	# of cars avail. on the weekend
Spearman's rho	Age	Corr. Coeff.	1.000												
		Sig. (2-tail.)	.												
		N	63												
	Gender	Corr. Coeff.	**-.326(**)**	1.000											
		Sig. (2-tail.)	0.009	.											
		N	63	63											
	Education Level	Corr. Coeff.	0.082	**.322(*)**	1.000										
		Sig. (2-tail.)	0.527	0.011	.										
		N	62	62	62										
	HH Income	Corr. Coeff.	**.464(**)**	-0.114	0.215	1.000									
		Sig. (2-tail.)	0.000	0.378	0.096	.									
		N	62	62	61	62									
	Does not have a partner	Corr. Coeff.	**-.263(*)**	0.076	-0.233	**-.359(**)**	1.000								
		Sig. (2-tail.)	0.037	0.552	0.068	0.004	.								
		N	63	63	62	62	63								
	# of children in HH	Corr. Coeff.	0.078	-0.068	0.087	**.398(**)**	**-.327(**)**	1.000							
		Sig. (2-tail.)	0.543	0.598	0.500	0.001	0.009	.							
		N	63	63	62	62	63	63							
	Work schedule varies daily	Corr. Coeff.	0.149	-0.065	0.032	-0.203	-0.090	-0.089	1.000						
		Sig. (2-tail.)	0.286	0.646	0.821	0.144	0.520	0.525	.						
		N	53	53	53	53	53	53	53						
	Hours worked per day	Corr. Coeff.	**.285(*)**	-0.070	0.153	0.241	**-.332(*)**	**.330(*)**	0.177	1.000					
		Sig. (2-tail.)	0.045	0.631	0.288	0.092	0.018	0.019	0.250	.					
		N	50	50	50	50	50	50	44	50					
	Hours worked per week	Corr. Coeff.	**.379(**)**	-0.042	**.398(**)**	**.398(**)**	**-.413(**)**	**.336(*)**	**.372(*)**	**.735(**)**	1.000				
		Sig. (2-tail.)	0.005	0.761	0.003	0.003	0.002	0.013	0.010	0.000	.				
		N	54	54	54	54	54	54	47	50	54				
	Dedicated place to	Corr. Coeff.	0.069	-0.075	0.187	-0.090	-0.034	-0.102	**.418(**)**	0.056	0.122	1.000			
		Sig. (2-tail.)	0.602	0.570	0.156	0.500	0.800	0.440	0.002	0.703	0.383	.			

		N	59	59	59	59	59	59	52	49	53	59			
	Frequency of working at home	Corr. Coeff.	-0.072	0.176	**.278(*)**	-0.035	0.103	0.189	**.282(*)**	0.133	0.193	**.344(**)**	1.000		
		Sig. (2-tail.)	0.576	0.168	0.029	0.788	0.424	0.139	0.041	0.356	0.161	0.008	.		
		N	63	63	62	62	63	63	53	50	54	59	63		
	# of cars avail. on a weekday	Corr. Coeff.	**.362(**)**	-0.148	-0.065	**.387(**)**	-0.220	**.353(**)**	-0.137	**.288(*)**	0.194	-0.111	0.065	1.000	
		Sig. (2-tail.)	0.004	0.251	0.619	0.002	0.086	0.005	0.331	0.045	0.163	0.406	0.617	.	
		N	62	62	61	61	62	62	52	49	53	58	62	62	
	# of cars avail. on the weekend	Corr. Coeff.	0.241	-0.187	-0.038	**.408(**)**	**-.346(**)**	**.402(**)**	-0.167	0.267	0.221	-0.171	0.017	**.825(**)**	1.000
		Sig. (2-tail.)	0.059	0.146	0.770	0.001	0.006	0.001	0.233	0.063	0.112	0.200	0.893	0.000	.
		N	62	62	61	61	62	62	53	49	53	58	62	61	62

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

A.2 ICT use, work spatial flexibility and household (HH) variables

			Freq. email over telephone to colleagues	Freq. email over telephone to friends	Freq. email over telephone to family	Freq. email over telephone to clients	Work-related activities at hotspot	Uses ICT to be more productive	Uses ICT to flexibly plan day	Uses ICT to avoid travel	Household with children	# cars avail. on a weekday	Hours works per week	Freq. of working at home
Spearman's rho	Freq. email over telephone to colleagues	Corr. Coeff.	1,000											
		Sig. (2-tail.)	.											
		N	59											
	Freq. email over telephone to friends	Corr. Coeff.	**,399(**)**	1,000										
		Sig. (2-tail.)	0,002	.										
		N	59	62										
	Freq. email over telephone to family	Corr. Coeff.	0,243	**,552(**)**	1,000									
		Sig. (2-tail.)	0,068	0,000	.									
		N	57	59	60									
	Freq. email over telephone to clients	Corr. Coeff.	**,505(**)**	0,125	0,251	1,000								
		Sig. (2-tail.)	0,000	0,357	0,064	.								
		N	56	56	55	56								
	Work-related activities at hotspot	Corr. Coeff.	,**410**(**)	0,029	-0,074	,**470**(**)	1,000							
		Sig. (2-tail.)	0,001	0,823	0,579	0,000	.							
		N	58	60	58	55	61							
	Uses ICT to be more productive	Corr. Coeff.	**,490(**)**	0,140	0,203	**,567(**)**	**,427(**)**	1,000						
		Sig. (2-tail.)	0,000	0,283	0,124	0,000	0,001	.						
		N	59	61	59	56	61	62						
	Uses ICT to flexibly plan day	Corr. Coeff.	**,409(**)**	0,062	0,067	**,457(**)**	**,367(**)**	**,783(**)**	1,000					
		Sig. (2-tail.)	0,001	0,641	0,616	0,000	0,004	0,000	.					
		N	58	60	58	55	60	61	61					
	Uses ICT to avoid travel	Corr. Coeff.	**,291(*)**	0,030	-0,014	**,399(**)**	**,298(*)**	**,595(**)**	**,708(**)**	1,000				
		Sig. (2-tail.)	0,025	0,818	0,915	0,002	0,020	0,000	0,000	.				
		N	59	61	59	56	61	62	61	62				
	HH with	Corr. Coeff.	0,222	-0,059	-0,016	**,275(*)**	0,230	**,311(*)**	0,249	**,386(**)**	1,000			

	children	Sig. (2-tail.)	0,091	0,647	0,901	0,040	0,074	0,014	0,053	0,002	.			
		N	59	62	60	56	61	62	61	62	63			
	# cars avail. on a weekday	Corr. Coeff.	0,180	0,052	**,314(*)**	0,157	-0,068	**,364(**)**	**,346(**)**	**,332(**)**	**,295(*)**	1,000		
		Sig. (2-tail.)	0,177	0,689	0,016	0,254	0,605	0,004	0,007	0,009	0,020	.		
		N	58	61	59	55	60	61	60	61	62	62		
	Hours works per week	Corr. Coeff.	**,464(**)**	**,287(*)**	0,144	**,375(**)**	0,219	**,406(**)**	**,332(*)**	**,307(*)**	**,403(**)**	0,194	1,000	
		Sig. (2-tail.)	0,000	0,037	0,310	0,007	0,111	0,002	0,015	0,024	0,002	0,163	.	
		N	53	53	52	50	54	54	53	54	54	53	54	
	Freq. of working at home	Corr. Coeff.	**,613(**)**	**,269(*)**	0,017	**,481(**)**	**,441(**)**	**,445(**)**	**,359(**)**	**,432(**)**	0,227	0,035	**,299(*)**	1,000
		Sig. (2-tail.)	0,000	0,034	0,898	0,000	0,000	0,000	0,004	0,000	0,073	0,787	0,028	.
		N	59	62	60	56	61	62	61	62	63	62	54	63

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

A.3 Transport modes used by Internet survey respondents

Correlations

			Freq. of using a car-sharing service	Freq. of using public transport	Freq. of using a carpooling service	Freq. of carpooling	Freq. of using an interrégional bus service	Freq. of using the train.	Freq. of using the car	Freq. of walking (not for pleasure)	Freq. of using the bike (not for pleasure)	Freq. of using a bike sharing service.	Total # of diff. modes used in past year.
Spearman's rho	Freq. of using a car-sharing service	Corr. Coeff.	1.000										
		Sig (2-tail.)	.										
		N	47										
	Freq. of using public transport	Corr. Coeff.	-0.052	1.000									
		Sig (2-tail.)	0.733	.									
		N	46	58									
	Freq. of using a carpooling service	Corr. Coeff.	0.261	0.108	1.000								
		Sig (2-tail.)	0.083	0.460	.								
		N	45	49	51								
	Freq. of carpooling	Corr. Coeff.	0.169	0.113	0.158	1.000							
		Sig (2-tail.)	0.273	0.444	0.283	.							
		N	44	48	48	49							
	Freq. of using an interrégional bus service	Corr. Coeff.	0.174	.393(**)	.377(**)	0.160	1.000						
		Sig (2-tail.)	0.241	0.003	0.008	0.276	.						
		N	47	54	49	48	55						
	Freq. of using the train.	Corr. Coeff.	.377(**)	0.059	0.081	.428(**)	.588(**)	1.000					
		Sig (2-tail.)	0.009	0.686	0.593	0.003	0.000	.					
		N	47	49	46	45	50	51					
	Freq. of using the car	Corr. Coeff.	-0.229	-.392(**)	-.404(**)	-0.151	-.524(**)	-0.260	1.000				
		Sig (2-tail.)	0.139	0.004	0.005	0.317	0.000	0.078	.				
		N	43	53	47	46	50	47	55				
	Freq. of walking (not just for pleasure)	Corr. Coeff.	0.019	.461(**)	0.245	.292(*)	0.224	0.234	-.487(**)	1.000			
		Sig (2-tail.)	0.898	0.000	0.094	0.047	0.107	0.102	0.000	.			
		N	46	54	48	47	53	50	51	56			
	Freq. of	Corr. Coeff.	0.232	0.156	0.130	0.078	0.027	-0.115	-0.270	.292(*)	1.000		

	using the bike	Sig (2-tail.)	0.135	0.279	0.385	0.609	0.853	0.446	0.061	0.042	.		
		N	43	50	47	45	48	46	49	49	51		
	Freq. of using a bike sharing service.	Corr. Coeff.	.453(**)	0.062	0.177	0.032	.362(*)	.335(*)	-0.111	0.205	0.289	1.000	
		Sig (2-tail.)	0.002	0.688	0.250	0.838	0.015	0.024	0.485	0.183	0.064	.	
		N	45	44	44	44	45	45	42	44	42	45	
	Total # of diff. modes used in past year.	Corr. Coeff.	0.231	.528(**)	.339(*)	.522(**)	.369(**)	.348(*)	-.334(*)	.564(**)	.440(**)	.355(*)	1.000
		Sig (2-tail.)	0.118	0.000	0.015	0.000	0.006	0.012	0.013	0.000	0.001	0.017	.
		N	47	58	51	49	55	51	55	56	51	45	63

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix B: Patterns used for the spatial analysis

Pattern group PATTERN NAME(S)	**Questions developed in relationship to the pattern(s)**	**Hypotheses presented by Alexander (1977)**
Orientation of spaces 105. SOUTH-FACING OUTDOORS** 128. INDOOR SUNLIGHT* 107. WINGS OF LIGHT**	Does the hotspot have an outdoor space and does it face south? Is the space easily accessible? What direction do the indoor spaces face? Is the hotspot properly lit by daylight?	That an outdoor space should be situated on the south side of a building in order to be successful. The most important spaces should be placed on the south side of the building. Indoor spaces should be properly lit by daylight.
Relationship to the outside 106. POSITIVE OUTDOOR SPACE** 140. PRIVATE TERRACE ON THE STREET** 166. GALLERY SURROUND* 164. STREET WINDOWS* 165. OPENING TO THE STREET* 236. WINDOWS WHICH OPEN WIDE* 222. LOW SILL 192. WINDOWS OVERLOOKING LIFE*	Is the outdoor space organized to be a continuation of the interior space? Is there an outdoor space that allows the visitors of the hotspot to participate in street life? Does the hotspot have a porch, arcade, balcony, awning, terrace or gallery? Are there windows or balconies that look down onto the street where the hotspot is located? How visible are the activities occurring inside the hotspot from the street? (whether terraces, open doors, open windows or large transparent windows) Do the windows open in order to create a connection to the street? How does the height of the window sill contribute to creating a connection with the outside? Do people congregate towards the windows and what do these windows look out upon? Does the amount of window area connect or separate the	Outdoor spaces should be well-defined as a distinct place and not simply left over. Common spaces should open out to the street. but be slightly raised above it to create privacy. People should be able to walk out of a building onto a space which serves as an intermediary between the building and the world outside. Streets are welcoming when the buildings that surround them have windows and balconies that look down upon them. “The sight of action is incentive for action” (p. 774). Windows which open wide allows the connection to the outside to be controlled by the users. Sills that are too high cut off a connection between the inside and the outside. “Rooms without a view are prisons for the people who have to stay in them” (p. 890)

	inside from the outside?	
Patterns that delineate spaces 112. ENTRANCE TRANSITION** 131. THE FLOW THROUGH ROOMS 135. TAPESTRY OF LIGHT AND DARK 252. POOLS OF LIGHT** 127. INTIMACY GRADIENT** 142. SEQUENCE OF SITTING SPACES* 190. CEILING HEIGHT VARIETY**	What spaces have to be crossed to enter the hotspot? Is there a change of light, sound, direction, surface level, enclosure, view? Where do the circulation spaces fall? Do they combine or separate spaces? Is the lighting even or does it vary? Which spaces are more private than others? What is the level of intimacy of the different places where people can sit? Does the ceiling or floor height vary and what is the intimacy of the spaces created by them?	A transition from the street to the inside of the building aids in delineating inside and outside. Spaces should be arranged as a continuation and separated by transition spaces. not corridors. Varying light levels creates interest and avoids monotony. Spaces within a building should be laid out as hierarchically according to intimacy. Places to sit should have varying degrees of intimacy in order to accommodate different kinds of activities. The level of intimacy should be articulated by changes in ceiling and floor height.
Patterns that attract people 121. PATH SHAPE* 123. PEDESTRIAN DENSITY* 124. ACTIVITY POCKETS** 110. MAIN ENTRANCE**	What kind of street is the hotspot located on? Are there places where people stop and linger? Does the street seem to have a large amount of pedestrians? Does the area between the buildings and the street (the edge) provide places for activities to happen, for people to gather? Is the main entrance visible from many angles? How does the main entrance stand out?	In order for a street to be a place to stay. instead of simply a space to move through. there should be a variety of places to stop and linger. The “liveliness” (p. 597) of the street depends on the level of activity created by the amount of people there. “The life of a public square forms naturally around its edges” (p. 600). Main entrances should be immediately visible from “main avenues of approach” (p. 544)
Places for people to be spectators 125. STAIR SEATS* 133. STAIRCASE AS A STAGE 241. SEAT SPOTS** 242. FRONT DOOR BENCH* 243. SITTING WALL**	Are there places from which people can easily be spectators of a larger activity? Is there a staircase in the space? Is it central? Can it be inhabited? Are their outdoor places for people to sit and what can be viewed from them?	Public spaces should have places where people can be spectators of activities without necessarily participating. The stair should be treated as a volume which animates space. not simply separates floors. It has a potential to become a place for people to be spectators of activity. Outdoor places to sit should have a view and allow

		people to congregate outside the building.
Places for people to be together 129. COMMON AREAS AT THE HEART 139. FARMHOUSE KITCHEN 147. COMMUNAL EATING 185. SITTING CIRCLE*	Is there an area which creates informal contact between visitors? In places that serve food, what is the relationship of the bar or the preparation area to the seating area? Is it integrated or separate and how does this affect the sound or the odors of the space? Does the activity of the kitchen or bar become central and do individuals crowd around it or seem to avoid it? Are there places where strangers are forced to sit together?	Communal functions should be centrally situated in order to encourage informal contact between individuals in a space. Food preparation is an opportunity to bring people together. Kitchens should not be relegated to a back room. Giving people places to sit together can create opportunities for informal interaction.
Places for people to be alone 141. A ROOM OF ONE'S OWN 179. ALCOVES** 183. WORKPLACE ENCLOSURE** 180. WINDOW PLACES** 231. DORMER WINDOWS?	Are there places for people to retreat to be alone? Are there spaces that are separate but connected to the main space? Where do people place the wall when they sit? How close are other people?	"No one can be close to others without also having frequent opportunities to be alone" (p. 669). "To give people a chance to be a together as a group. a room must also give them the chance to be alone" (p. 829) A good workplace reaches a balance between enclosure and exposure.
The character of interior spaces 197. THICK WALLS** 253. THINGS FROM YOUR LIFE* 249. ORNAMENT 250. WARM COLORS**	How do walls become places of expression? What is displayed on walls? What is their color? Is there a theme? Are their different types of chairs or are they all the same?	Walls can be given character by increasing their thickness and using the thickness creatively. The decoration of space should tell a story.

Appendix C: The Internet survey questionnaire

L'Internet sans-fil dans la ville: habiter l'espace public avec les nouvelles

1. Introduction

ZAP Québec est un organisme à but non lucratif, constitué de bénévoles, qui offre aux commerces de la ville de Québec, de Lévis, et des municipalités adjacentes la gestion de l'accès Internet sans-fil que ces derniers fournissent gratuitement à leur clientèle. Il fait partie d'un réseau d'organismes similaires comme ZAP Sherbrooke, Île Sans Fil à Montréal et Ottawa-Gatineau WiFi.

Grâce au travail constant de ZAP Québec, les citoyens et visiteurs de la Ville de Québec ont un accès sans-fil gratuit à l'Internet dans plus de 150 parcs, restaurants, cafés, bibliothèques, et arénas. Ce questionnaire s'adresse à vous, abonné(e) de ZAP Québec, afin de comprendre vos pratiques d'utilisation des points d'accès WiFi. Bien entendu, vous utilisez peut-être un accès sans-fil à des lieux publics qui ne font pas partie de ZAP Québec. Nous nous intéressons à vos pratiques partout, y compris ceux regroupés par ZAP Québec.

Cette enquête s'inscrit dans le cadre des travaux du Groupe interdisciplinaire de recherche sur les banlieues (GIRBa) de l'Université Laval. Le projet de recherche, intitulé « Comprendre l'entrelacement des nouvelles technologies de l'information et de la communication et les systèmes de transport dans les mobilités émergentes : le télétravail à Québec », est mené par Michael Doyle, étudiant à la maîtrise en sciences de l'architecture à l'École d'architecture de l'Université Laval, sous la direction de la professeure d'architecture Carole Després. Plus spécifiquement, elle vise à comprendre:

1. comment les technologies de l'information et de la communication (TIC) vous permettent de pratiquer un nombre croissant d'activités dans des lieux publics et semi-publics;
2. Si les lieux d'arrêt des transports collectifs influencent votre utilisation de certaines bornes WiFi;
3. Si la localisation du lieu WiFi dans la ville joue un rôle dans le fait de l'utiliser ou non;
4. Si l'ambiance architecturale joue un rôle dans le choix du lieu WiFi fréquenté;
5. Les façons dont le temps de déplacement et d'attente est vécu avec des nouvelles technologies (TIC).

Le but de cette enquête est de comprendre comment mieux aménager les lieux publics avec des accès sans-fil à l'Internet pour favoriser leur utilisation.

Nous vous serions extrêmement reconnaissant de répondre aux questions qui suivent concernant vos pratiques et expériences de lieux offrant un accès à l'Internet sans fil, sur votre utilisation des nouvelles technologies (TIC) et sur les modes de transport que vous utilisez le plus souvent pour vous déplacez. Le questionnaire compte une cinquantaine de questions et prend une vingtaine de minutes. Vous aurez également l'option d'enregistrer et continuer le questionnaire plus tard (sur le même ordinateur) si vous avez besoin de plus de temps.

Toutes vos réponses demeureront confidentielles et seront traitées de manière anonyme. Les données conservées pour une utilisation ultérieure seront préalablement dépersonnalisées de manière irréversible. Le matériel de recherche sera détruit le 1er janvier 2012. Si vous avez des questions sur ce questionnaire ou le projet de recherche, vous pourriez contacter Michael Doyle à l'adresse courriel michael.doyle.1@ulaval.ca. Si vous avez des plaintes à formuler au sujet de cette enquête, vous pouvez vous adresser à Odette Lagacé, Ombudsman de l'Université Laval, au (418) 656-3081 ou à l'adresse courriel info@ombudsman.ulaval.ca.

Nous vous remercions d'avance de votre participation à ce questionnaire. Sachez que vous contribuez à orienter le développement futur de l'Internet sans-fil dans les lieux publics.

Ce projet a été approuvé par le Comité d'éthique de la recherche avec des êtres humains de l'Univeristé Laval (n° 2009-124/08-06-2009).

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2. La Zone Accès Public (ZAP) et d'autres points d'accès

Cette section s'intéresse à votre expérience de l'utilisation de l'Internet sans-fil dans des lieux publics.

1. Depuis combien de temps êtes-vous membre de ZAP Québec ?

Commentaires

1. Moins d'un mois
2. 1-6 mois
3. 7-11 mois
4. 1-2 ans
5. Plus que 2 ans

2. Parmi les lieux suivants, quels sont ceux que vous fréquentez le plus souvent pour utiliser l'accès à l'Internet sans-fil gratuitement...

	Choix 1	Choix 2	Choix 3
Lesquelles fréquentez-vous le plus souvent ?			
Lesquelles sont vos préférées ?			

Commentaires

The 154 ZAP hotspots

3. Y en a-t-il d'autres dans ce territoire ? Veuillez préciser si l'accès à l'Internet est gratuit ou payant.

Nom et adresse ou intersection

Nom et adresse ou intersection

Nom et adresse ou intersection

Nom et adresse ou intersection

4. Y en a-t-il d'autres en dehors de ce territoire ? (Par exemple, dans d'autres villes, dans le train, aux aéroports, etc.)

Nom et adresse ou intersection

Nom et adresse ou intersection

Nom et adresse ou intersection

Nom et adresse ou intersection

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5. Quelles périodes de la journée préférez-vous pour aller utiliser un accès à l'Internet sans-fil dans un lieu public pendant la semaine et la fin de semaine ? Cochez autant de réponses que nécessaire.

	Avant 8h30	Entre 8h30 et midi	À l'heure du dîner	13h00 - 17h	Au souper	En soirée
La semaine	☐	☐	☐	☐	☐	☐
La fin de semaine	☐	☐	☐	☐	☐	☐

Commentaires

6. Pour l'ensemble de ces lieux, à quelle fréquence les fréquentez-vous ?

- ○ Une à quelques fois par jour
- ○ Une à quelques fois par semaine
- ○ Une à quelques fois par mois
- ○ Une à quelques fois par année

Commentaires

7. Quel mode de transport utilisez-vous habituellement pour vous rendre à votre ou vos lieux publics avec accès sans fil à l'Internet préférés ? Cochez autant de réponses que nécessaire.

- ☐ La marche
- ☐ La voiture
- ☐ Le transport en commun
- ☐ Le vélo

Autres (veuillez préciser)

L'Internet sans-fil dans la ville: habiter l'espace public avec les nouvelles

8. Combien de temps passez-vous dans chacun des lieux avec accès à l'Internet sans-fil que vous fréquentez ? Cochez autant de réponses que nécessaire.

- [ ] moins de 15 minutes
- [ ] entre 16 et 30 minutes
- [ ] entre 30 et une heure
- [ ] entre une heure et deux heures
- [ ] entre deux heures et quatre heures
- [ ] Plus que quatre heures

Commentaires

9. En ce qui concerne votre premier choix de ZAP préférée, pourquoi celle-ci est votre préférée ? Cochez autant de réponses que nécessaire.

- [ ] La vitesse de l'Internet sans-fil
- [ ] L'ambiance
- [ ] La lumière naturelle
- [ ] Sa proximité au transport en commun
- [ ] La disponibilité des places assises
- [ ] Les autres personnes qui fréquentent la ZAP en même temps que vous
- [ ] Sa proximité à votre maison ou appartement
- [ ] Les autres services à part le WiFi (le boisson, la nourriture, etc.)
- [ ] La disponibilité des prises de courant
- [ ] Les vues vers l'extérieur

Autres (veuillez préciser)

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10. Quelles activités faites vous généralement lorsque vous utilisez l'Internet sans-fil dans un lieu public ? Veuillez préciser si cette activité est d'ordre personnel, professionnel ou les deux.

	Personnel	Professionnel	Les deux	N/A
Faire des achats en ligne	○	○	○	○
Chercher de l'information	○	○	○	○
Écrire sur un blogue (Tumblr, Wordpress, Blogspot, etc.)	○	○	○	○
Faire des appels avec un téléphone VOIP (Skype)	○	○	○	○
Lire des courriels	○	○	○	○
Clavarder (chat) sur Internet (messagerie instantanée comme MSN)	○	○	○	○
Écrire des courriels	○	○	○	○
Écouter de la musique	○	○	○	○

Commentaires

11. À part utiliser l'Internet sans-fil gratuit dans ces lieux, que faites-vous ? Cochez autant de réponses que nécessaire.

- ☐ Travailler sans utiliser l'Internet
- ☐ Lire
- ☐ Rencontrer des collègues
- ☐ Manger, boire
- ☐ Observer d'autres personnes
- ☐ Écrire
- ☐ Rencontrer des amis
- ☐ Rencontrer des clients

Commentaires

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12. Habituellement, vous allez à votre ou vos lieu(x) préféré(s) offrant l'Internet sans-fil... (Cochez autant de réponses que nécessaire)

- [ ] avec des collègues
- [ ] avec des clients
- [ ] avec des amis
- [ ] avec de la famille
- [ ] tout(e) seul(e)

Autre (veuillez préciser)

13. À votre lieu public préféré, utilisez-vous l'Internet sans-fil dans le cadre des activités liées à votre travail ?

Oui
Non

Commentaires

Si vous avez répondu "Oui" à la question 13, continuez à la question 14. Sinon, allez tout de suite à la question 15.

14. Lorsque votre (ou un de vos) lieu(x) préféré(s) pour utiliser l'Internet sans-fil est un lieu où vos activités sont liées au travail, considérez-vous ce lieu comme votre lieu de travail principal ou secondaire ?

- ○ Principal
- ○ Secondaire

Commentaires

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15. Selon le type d'usages que vous faites de l'Internet sans-fil dans les lieux publics, quelle est l'importance d'avoir ce type d'accès Internet aux:

	Pas utile	Peu utile	Assez utile	Très utile
Aéroports	○	○	○	○
Abribus chauffé protégé	○	○	○	○
Aréna	○	○	○	○
Autobus	○	○	○	○
Bibliothèques	○	○	○	○
Cafés	○	○	○	○
Centre commercial	○	○	○	○
Centre de sports	○	○	○	○
Gare de trains / d'autobus	○	○	○	○
Hôtel	○	○	○	○
Parcs	○	○	○	○
Restaurants	○	○	○	○
Salle d'attente	○	○	○	○
Traversier	○	○	○	○

Commentaires

16. De manière générale, quels sont les principaux avantages pour vous d'avoir des accès sans fil à l'Internet partout dans la ville ?

17. Selon vos besoins, quels autres lieux devraient avoir un accès gratuit à l'Internet à Québec, à Lévis et dans les municipalités adjacentes ?

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3. Les nouvelles technologies

Cette section s'intéresse à vos pratiques avec les nouvelles technologies.

18. Quels dispositifs ou appareils utilisez-vous pour accéder à l'Internet sans-fil dans vos lieux publics préférés ? Cochez autant de réponses que nécessaire.

- [ ] assistant personnel numérique (Palm Pilot)
- [ ] lecteur MP3 (iPod Touch)
- [ ] mini ordinateur portable (netbook)
- [ ] ordinateur portable
- [ ] téléphone cellulaire intelligent (iPhone, Blackberry, etc.)

Autres (veuillez préciser)

19. Utilisez-vous votre téléphone cellulaire pour accéder à l'Internet ?

Commentaires

Oui
Non

20. Êtes-vous membre d'un ou des sites de réseautage social ou professionnel suivant ?

- [ ] Facebook
- [ ] MySpace
- [ ] LinkedIn
- [ ] Twitter
- [ ] Aucun

Autres (veuillez préciser)

21. Est-ce que vous produisez du contenu sur un blogue ?

Commentaires

Oui
Non

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22. Si vous produisez du contenu sur un ou plusieurs blogues, est-ce que vos blogues sont d'ordre professionnel ou personnel ? Cochez autant de réponses que nécessaire.

- ☐ J'ai un blogue personnel
- ☐ J'ai un blogue professionnel
- ☐ J'ai un blogue qui est à la fois d'ordre professionnel et personnel
- ☐ Je ne produit pas de contenu sur un blogue

Commentaires

23. Possédez-vous un agenda personnel ?

1. Agenda format papier
2. Agenda numérique
3. Agendas formats papier et numérique
4. Je n'ai pas d'agenda

Commentaires

24. Parmi les dispositifs / appareils que vous utilisez, où les utilisez-vous ? Veuillez préciser lesquels vous transportez avec vous au quotidien.

	Chez moi	Au bureau	Je transporte avec moi
Assistant personnel numérique (Palm Pilot)	☐	☐	☐
Console de vidéo portable	☐	☐	☐
Lecteur MP3 / iPod	☐	☐	☐
Mini ordinateur portable	☐	☐	☐
Ordinateur de table	☐	☐	☐
Ordinateur portable	☐	☐	☐
Pagette	☐	☐	☐
Un accès AVEC fil à l'Internet (DSL ou câble)	☐	☐	☐
Un accès sans-fil à l'Internet	☐	☐	☐

Commentaires

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25. Quels appareils / dispositifs utilisent les autres personnes qui habitent avec vous ? Cochez autant de réponses que nécessaire.

	Conjoint(e)	Enfant 1	Enfant 2	Enfant 3	Ami 1	Ami 2
Assistant personnel numérique (Palm Pilot)	☐	☐	☐	☐	☐	☐
Console de jeux vidéo	☐	☐	☐	☐	☐	☐
Lecteur MP3 (iPod)	☐	☐	☐	☐	☐	☐
Mini ordinateur portable (netbook)	☐	☐	☐	☐	☐	☐
Ordinateur de table	☐	☐	☐	☐	☐	☐
Ordinateur portable	☐	☐	☐	☐	☐	☐
Pagette	☐	☐	☐	☐	☐	☐
Téléphone cellulaire	☐	☐	☐	☐	☐	☐
Téléphone cellulaire intelligent (Blackberry, iPhone)	☐	☐	☐	☐	☐	☐

Commentaires

26. Lorsque vous êtes en déplacement, quels appareils / dispositifs utilisez-vous dans les lieux suivant même sans accès à l'Internet ? Cochez autant de réponses que nécessaire.

	Dans le train	Dans le bus	En attente d'un bus dans un Abribus	En attente d'un bus ou train dans une gare	Dans des aéroports	Dans des avions
Assistant personnel numérique (Palm Pilot)	☐	☐	☐	☐	☐	☐
Console de jeux vidéo	☐	☐	☐	☐	☐	☐
Lecteur MP3 (iPod)	☐	☐	☐	☐	☐	☐
Mini ordinateur portable (netbook)	☐	☐	☐	☐	☐	☐
Ordinateur portable	☐	☐	☐	☐	☐	☐
Téléphone cellulaire	☐	☐	☐	☐	☐	☐
Téléphone cellulaire intelligent (Blackberry, iPhone)	☐	☐	☐	☐	☐	☐

Commentaires

L'Internet sans-fil dans la ville: habiter l'espace public avec les nouvelles

4. Les transports individuels et collectifs

Cette section s'intéresse à vos habitudes de déplacement en transport individuel (comme la voiture) ou en transport collectif (comme le bus ou le train).

27. Parmi les modes de transport suivant, lesquel(s) utilisez-vous le plus pour vous déplacer au quotidien ? Lesquels sont vos préférés ? Cochez autant de réponses que nécessaire.

	J'utilise le plus souvent	Je préfère
La marche	☐	☐
La voiture	☐	☐
Le transport en commun	☐	☐
Le vélo	☐	☐

Autres (veuillez préciser)

28. Parmi les services suivants, lesquels avez-vous déjà utilisés et à quelle fréquence ?

	une à quelques fois par année	une à quelques fois par mois	une à quelques fois par semaine	tous les jours	jamais
Allo Stop	☐	☐	☐	☐	☐
Autobus interrégionaux (Orléans Express, Intercar, etc.)	☐	☐	☐	☐	☐
Auto-partage (Communauto)	☐	☐	☐	☐	☐
Covoiturage	☐	☐	☐	☐	☐
La location ponctuelle de vélo (Bixi)	☐	☐	☐	☐	☐
Le train (ViaRail ou Amtrak)	☐	☐	☐	☐	☐
Marche	☐	☐	☐	☐	☐
Transport en commun (métrobus, autobus)	☐	☐	☐	☐	☐
Vélo	☐	☐	☐	☐	☐
Voiture	☐	☐	☐	☐	☐

Autre (veuillez préciser)

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29. Comment planifiez-vous vos déplacements? Veuillez spécifier le(s) lieu(x) où vous les planifiez de ces façons. Cochez autant de réponses que nécessaire.

	Chez vous	Au bureau	En déplacement	À la ZAP
Trajecto (RTC)	☐	☐	☐	☐
Google Maps (itinéraires)	☐	☐	☐	☐
Québec 511 (information routière)	☐	☐	☐	☐
GPS (sur téléphone cellulaire)	☐	☐	☐	☐
GPS (en voiture)	☐	☐	☐	☐

Commentaires

30. Combien de temps passez-vous à vous déplacer en heures ou minutes par semaine en moyenne ?

pour un jour de semaine

pour un jour de fin de semaine

31. Au quotidien, je trouve que je me déplace beaucoup trop...

	Pas du tout d'accord	Peu d'accord	Plutôt en accord	Tout à fait d'accord	N/A
pour des raisons professionnelles.	○	○	○	○	○
pour des raisons personnelles.	○	○	○	○	○

Commentaires

32. J'envoie plus souvent un courriel que je téléphone...

	Très rarement	Plutôt rarement	Plutôt souvent	Très souvent	N/A
à mes collègues	○	○	○	○	○
à mes amis	○	○	○	○	○
à ma famille	○	○	○	○	○
à mes clients	○	○	○	○	○

Commentaires

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33. Avoir un accès sans fil à l'Internet dans les autobus et aux arrêts de bus...

	Pas du tout d'accord	Peu d'accord	Plutôt en accord	Tout à fait d'accord	N/A
rendrait le temps de déplacement plus agréable.	○	○	○	○	○
rendrait le temps d'attente plus agréable.	○	○	○	○	○
me permettrait de me renseigner sur les heures de desserte des lignes de bus.	○	○	○	○	○
me permettrait d'optimiser mon trajet avec le service Trajecto du RTC.	○	○	○	○	○

Commentaires

34. J'utilise les technologies de l'information et de la communication (TIC)...

	Pas du tout d'accord	Peu d'accord	Plutôt en accord	Tout à fait d'accord	N/A
parce que je peux éviter de me déplacer.	○	○	○	○	○
parce que la planification de mes journées est plus flexible.	○	○	○	○	○
parce que mes journées sont plus productives.	○	○	○	○	○

Autre (veuillez préciser)

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5. Profil personnel et professionnel

Le questionnaire se termine en vous posant plusieurs questions sur votre vie personnelle et professionnelle

35. Êtes-vous actuellement en vacances ?

Commentaires

Oui
Non

36. Quel est votre âge ?

Commentaires

1. en bas de 18 ans
2. 18-24 ans
3. 25-34 ans
4. 35-44 ans
5. 45-54 ans
6. 55-64 ans
7. 65 ans et plus

37. Quel est votre sexe ?

Commentaires

Homme
Femme

38. Combien d'enfants habitent chez vous ? Veuillez préciser leurs âges.

	moins de 12 ans	12 - 16 ans	plus que 17 ans	N/A
Enfant 1	○	○	○	○
Enfant 2	○	○	○	○
Enfant 3	○	○	○	○

Autres (veuillez préciser)

39. Quel est votre niveau de scolarité ?

Commentaires

1. École secondaire
2. Études collégiales
3. Diplôme collégial (DEC)
4. Études universitaires
5. Diplôme universitaire

40. Quel est le revenu annuel de votre ménage ?

Commentaires

Je préfère ne pas répondre	20000 à 24999	75000 à 84999
moins de 5 000 $	25000 à 29999	85000 à 99999
5 000 à 7 499 $	30000 à 34999	100000 à 124999
7500 à 9999	35000 à 34999	125000 à 149999
10000 12499	40000 à 49999	150000 à 174999
12500 à 14999	50000 à 59999	175000 et plus
15000 à 19999	60000 à 74999	

41. À combien de voitures avez-vous accès ?

	0	1	2	3+
La semaine	☐	☐	☐	☐
La fin de semaine	☐	☐	☐	☐

Autre (veuillez préciser)

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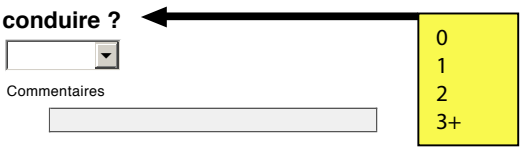
42. Parmi vous et les personnes qui habitent avec vous, combien ont un permis de conduire ?



Commentaires

43. Quelle est votre situation professionnelle ? Cochez autant de réponses que nécessaire.

- [ ] J'étudie à temps partiel
- [ ] J'étudie à temps plein
- [ ] Je ne travaille pas
- [ ] Je suis à la retraite
- [ ] Je suis en arrêt de travail
- [ ] Je travaille à temps partiel
- [ ] Je travaille à temps plein

Commentaires

44. Si vous avez un(e) conjoint(e), quelle est sa situation professionnelle ? Cochez autant de réponses que nécessaire

- [ ] Il/Elle étudie à temps partiel
- [ ] Il/Elle étudie à temps plein
- [ ] Il/Elle est à la retraite
- [ ] Il/Elle est en arrêt de travail
- [ ] Il/Elle ne travaille pas
- [ ] Il/Elle travaille à temps partiel
- [ ] Il/Elle travaille à temps plein
- [ ] Je n'ai pas de conjoint(e)

Commentaires

45. Quel est votre emploi ?

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46. Votre horaire de travail est très variable...

	Oui	Non	Ne s'applique pas
d'une journée à l'autre	○	○	○
d'une semaine à l'autre	○	○	○
d'un mois à l'autre	○	○	○
d'une année à l'autre	○	○	○
mon horaire de travail est très régulier	○	○	○

Commentaires

47. Combien d'heures travaillez-vous en moyenne...

par jour ?

par semaine ?

48. Avez-vous un espace dédié de travail dans votre lieu de résidence ?

- ○ Oui
- ○ Non

Commentaires

49. Par quelle fréquence travaillez-vous à votre lieu de résidence ?

- ☐ Une à quelques fois par jour
- ☐ Une à quelques fois par semaine
- ☐ Une à quelques fois par mois
- ☐ Une à quelques fois par année
- ☐ Je ne travaille jamais chez moi

Commentaires

50. Par rapport à votre lieu de résidence, vous êtes...

- ○ Propriétaire d'une maison
- ○ Propriétaire d'un condominium
- ○ Locataire

Autre (veuillez préciser)

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51. Où habitez-vous ?

Ville
Pays
Code Postal

52. Où travaillez-vous ?

Ville
Pays
Code Postal

53. Nous aimerions en savoir plus sur votre expérience avec des nouvelles technologies (TIC) et les systèmes de transport. Si vous êtes disposé(e) à participer à une enquête avec un chercheur de l'Université Laval, veuillez laisser votre adresse courriel ou votre numéro de téléphone ci-dessous:

Courriel
N° téléphone

54. Si vous voulez être considéré pour un de nos prix de participation et vous n'avez pas répondu à la question 53, veuillez nous laisser une façon de vous contacter dans le cas où votre nom est tiré.