AGING IN A DIGITAL WORLD

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The temporality of digital living is typically associated with the short history of the internet, the rapid obsolescence of digital technologies, and even the compression of time and space afforded through internet communication. We often overlook, however, the temporality of those that engage with digital life, assuming instead that everyone has citizenship in our digital world. Digital existence, however, appears to be somewhat attached to age and aging. And despite that today's older adults are healthier and better educated than prior generations, many of those over the age of 50 are somewhat isolated from digital life.

Older adults have been slower to use the internet, are less likely to have broadband access, and adopt technologies such as social media and smartwatches at lower rates. Increasingly, though, they are using new technologies and putting them to use in different ways and for different purposes than younger adults. For example, though they lag younger populations in adoption of smartphones and Twitter, the proportion of those owning tablets and e-readers compares much more favorably (Smith, 2014). Physical, perceptual and cognitive changes coincident with aging may present some explanation for this lower engagement, yet we suspect something more. There is mounting evidence that older adults approach digital life from unique perspectives. Older adults are often challenged by having to navigate unfamiliar concepts and interfaces, challenges often associated with a lack in digital literacy skills. But viewed through the lens of life experience, older adults bring perspectives to their use of technology that are distinct from those of younger users.

Who are these emerging entrants to digital life? What challenges and opportunities are associated with digital living in later life? What does it mean to grow older in the digital or to digitally age? This panel will explore the intersection of the internet and later life stages to begin to give shape to some answers.

Our first panelist begins with an exploration of the spectrum of digital technology use at older ages. Using an interpretive interactionist approach, this study examines the ways in which older adults are introduced to, use, display, and assign meaning to digital technologies. A typology of users emerges, revealing technology adoption at older ages to be a complex and dynamic process.

One of the challenges to digital living in later life is that the training and education life stage, which typically takes place in takes place during youth and young adulthood, has passed. Our second panelist examines the challenges inherent in acquiring digital literacy at older ages. Using a mixed methods approach, this study highlights that attaining digital competency at older ages not only encompasses the acquisition of skills, but also must focus on the cognitive and socio-emotional aspects of digital engagement to be truly successful.

Our third paper will focus on the adoption of a specific digital technology by older adults, a smart watch, and draws attention to the domestication processes that older adults employ in the adoption of a digital device. Using interviews, focus groups, and user logs, this study explores the discourses around the user relationship with the smartwatch, as well as its tracked use/non-use. In doing so, we are provided with a nuanced view of how technology use intersects with personal values and identity at older ages.

Media, especially mass media, are powerful forces of socialization in our culture. The ways in which groups are presented within media, often reflect a particular societal vision and create a social reality by suggesting ways in which the group in question 'should' act. Our fourth paper explores the role of digital play in older adulthood by examining the media representation of older adults as video game players. Through a content analysis of major newspaper and news organization accounts, this study explores how media representations resist and reinforce prevailing positive and negative stereotypes of older adults and aging, and discusses the implications.

Finally, our fifth panelist contemplates what it means not only to age in a digital world, but also what it means to age in an era that at once experiences rapid digital obsolescence while simultaneously considering the internet's potential immortality. By highlighting the intrinsic tension between the rhetoric of computer-mediated communication and the ways in which aging users conceive of and participate in internet communication, this study exposes how internet rules impact contemporary online and offline social interaction, and by extension, the digital reality of older adults.

In sum, this collection of papers provides a varied and nuanced view of what it means to age and be aging in today's digital world. Taken together, they provide important perspectives on how later life stages overlap with the internet, especially as its use grows increasingly central to the provision of information, resources, and sociality.

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A USER TYPOLOGY FOR UNDERSTANDING OLDER ADULT INFORMATION, COMMUNICATION, AND TECHNOLOGY (ICT) USE

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Introduction

Despite the dominant research discourse on older adults and Information and Communication Technologies (ICTs) use focusing on the two ends of the ICT use spectrum (the highly capable and the "want-nots") (Brabazon, 2005; Millward, 2003), our common sense tells us that older adults are a diverse group of ICT users. However, there is little empirical evidence in how older adults are using and integrating multiple forms of ICTs in their daily lives.

The following paper attempts to begin to fill that gap by describing an user typology of older adult ICT use developed through an interpretive interactionist (Denzin, 2001) study guided by Domestication Theory (Silverstone, 1994).

Literature Review

The current literature on older adults and ICT use concentrates on exploring how older adults use single ICT forms (such as computers), focuses on robotics and engineered solutions to help individuals deal with aging-related declines, and over relies on studying older adults who attend community centers or are living in institutionalized care environments (citation concealed). Therefore, little is understood about how older adults integrate multiple ICTs into their work, their family and friend relationships, and in their community lives.

Most of this literature also sees adoption as a simple "yes" or "no" process by which an ICT is either adopted or not (Citation concealed). Domestication Theory proposes that technology adoption is a complex process, by which ICTs are introduced, used (or rejected), are displayed, and come to develop meaning to users (Silverstone, 1994). Using Domestication Theory as a theoretical lens, the researcher sought to understand how older adults were using and integrating various forms of ICTs (including, but not limited to radio, television, telephone, cell phones, and computers) into all aspects of their lives.

Method

Using an interpretive interactionist method (Denzin, 2001), the researcher examined the ICT use of 17 members of the United States' Lucky Few's birth cohort (born 1935-1945) (Carlson, 2008). A birth-cohort (commonly referred to as generations) based design (Giele & Elder, 1998) was chosen rather than age criteria to account for the fact that ICT introduction is a historical event with dramatically different impacts for individuals depending upon their ages (and therefore life phase) (Citation concealed). For the Lucky Few, radio and telephone use was common in their childhood, television was

introduced during adolescence, and personal computers were introduced during their mid- to late-working careers.

Each of the 17 older adult participants was treated as a case. Each case included 3 interviews with the older adult, observations of the older adult's ICTs in their home and work (where applicable), and interviews with friends, family members and coworkers (where possible). Each case represented roughly six to fourteen hours of interviews. These interviews explored a short life history of the older adult and ICT use over their lifespan.

Interviews were transcribed, coded, and analyzed immediately following each interview, focusing on the meaning that ICTs held for the older adult. These meanings were brought to the following interview, which allowed the researcher to check the generated meaning of the ICTs with the older adult.

Results and Discussion

Based upon the 17 cases of older adult ICT users, a user typology emerged. This user typology suggests that users fall into one of five distinct types, each of which is unique in how they are introduced to, use, display, and come to assign meaning to ICTs. These five types include the Enthusiast, the Practicalist, the Socializer, the Traditionalist, and the Guardian. For brevity, three of these user types are highlighted below.

Enthusiasts "love" their "fun" ICTs. Enthusiasts are the most likely to be involved in highly technological careers and they enjoy discovering new ways to use their ICTs in all areas of their lives. Many of their relationships focus on ICT sharing and learning. They predominantly display ICTs in their home.

Practicalists see ICTs as "tools" for dedicated purposes in their work, family, and community lives. They place ICTs in function specific rooms, with computers located in offices and televisions placed in living rooms.

Guardians view all ICTs with "suspicion" as they believe all ICTs, if used incorrectly, allow individuals to exhibit negative human traits such as gluttony, selfishness, and laziness. They carefully self-regulate their own ICT use and tend to "hide" all forms of ICTs in their homes.

This user typology suggests that older adults of the Lucky Few birth cohort can be sorted into these five "user types," with each of these types differing in the way they are introduced to, use, display, and come to assign meaning to ICTs.

Conclusion and Future Work

The implications of the user typology presented in this paper are far-reaching. Technological adoption among older adults is complex and rooted in their user type,

such that any single ICT can have broadly different meanings to a given set of older adults.

Take the example of a smartphone. Enthusiasts, Practicalists, and even some Guardians may adopt a new smartphone, but each type will use it in a unique way. Enthusiasts will immediately fully explore their new "fun" smartphone and Practicalists will learn how to use the smartphone as a device for "work" to be productive (if applicable) and/or for "family" to stay in touch. Guardians, who are much more likely to prefer a simple cell phone, will likely set strict limits on their smartphone use.

This User Typology has several implications, for both researchers and practitioners. For researchers, this is a call away from understanding older adult ICT adoption as simple, but instead as a complex process. For practitioners, there is no single "older adult market" for ICT devices or innovations, as very different aspects of ICTs appeal (or fail to appeal) to each of the user types.

Future questions remain to be studied, including if this user typology is consistent across various birth cohorts, if it is observed cross-culturally, and when and how these user types develop.

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THE SENIORS DIGITAL LITERACY PARADOX: MEASURES OF DIGITAL LITERACY IN SENIORS

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Introduction

Internet penetration rates continue to increase in North America and the adoption of social media sites is rapidly growing (Duggan, et al., 2015). Through interventions such as E-rate many of the gaps in Internet use observed between social groups in the past have largely disappeared. Nonetheless, the rate at which older generations are lagging behind continues to be a cause for concern. According to a 2013 Pew report, 47% and 70% of adults and seniors have a broadband connection, respectively (Smith, 2014). Haight, Quan-Haase, and Corbett (2014) report a similar trend in Canada, where age continues to be a key predictor of Internet access and level of use. Evidence suggests that seniors lag behind in terms of their digital engagement and a key barrier to seniors utilizing the Internet has been identified as their lack of digital literacy (Broady, Chan, & Caputi, 2010). Understanding the second digital divide in the context of aging is critical because users' online skills enable them to engage with the internet in ways that are useful and meaningful to their specific needs (Hargittai, 2002). In addition, digital literacy allows users to feel competent when online and take full advantage of the features and capabilities afforded by the technology. The present study contributes to the literature on the second digital divide by specifically examining seniors and their digital literacy. The study investigates how we can measure seniors' digital literacy and what challenges are inherent in those kinds of measures. Being able to evaluate a seniors' digital literacy may be an important first step in helping them gain further experience and become more comfortable interacting with digital technology.

Research Question
How can we measure seniors' digital literacy and what challenges exist?

Methodology
We employed a mixed methods approach, collecting data via 23 surveys and 21 in-depth interviews. This is a good approach, as it allowed us to triangulate data from different sources and also balance the strengths and weaknesses of various data collection approaches. All participants were recruited from Southwestern Ontario and represent a population that has a good familiarity with digital technology. The age range

for participants was 61 to 84 (Md = 68). The majority of participants were female (81%) and 9 participants were married, 5 widowed, 4 divorced, and 2 single.

The survey was available either online or as a paper-and-pencil version to maximize participation by making different formats available. The survey included questions about computer and Internet use and specifically examined seniors' level of digital literacy based on a framework previously developed by Hargittai and Hsieh (2012). The survey data specifically helped to better understand seniors' familiarity with various internet-related terms, which we employ as a proxy for digital literacy (Hargittai & Hsieh, 2012). The ages of survey participants were between 60-84: 5 were between 60-64 years of age, 7 were between 65-69, 6 were 70-74, and 4 were between 80-84 years old.

Findings
Learning curve. For many seniors, digital literacy is difficult to achieve. This is often not directly linked to an unwillingness to learn, but rather to the notion that learning would take a lot of effort and constitute an enormous learning curve. Some seniors in our interviews don't shy away from taking on the challenge, but others engage in a careful cost-benefit analysis, and often realize that the cost is greater than the benefit:

"I wonder about age. Is it older people like me who are resistant to electronic media?" Or it's down for a number of hours and it's panic. So I think…I just wonder about it. You know, that's part of my age. I'm 82. So I think that's part of it, you know, there's a built-in resistance to, in a sense, think, "Do I have time to do this?" Is this how—what I want to do in how I spend my time?

Digital skills. There was a lot more variability in seniors' understanding of the terms than we expected. A few seniors were fairly technology savvy and understood many of the terms, while others only were familiar with a few. Terms we assumed most seniors would be familiar with were often not understood fully, but only somewhat. For instance, 8 seniors indicated understanding "advanced search", while 15 only had some understanding or none.

While we did not expect for seniors to be familiar with all the terms, it is clear that some terms are rather obscure for this population. For example, the majority did not know what the meaning is of such terms as RSS, tagging, weblog, and phishing.

Table 1. Digital skills of digital seniors.

	No Understanding	Little Understanding	Some Understanding	Good Understanding	Full understanding
Advanced search	1	3	11	4	4
Bookmarks	2	2	5	8	6
Favourites	1	0	5	11	5

Firewall	3	1	7	6	3
JPG	6	4	2	8	3
Malware	8	2	5	4	2
PDF	3	2	7	7	4
Phishing	10	2	4	6	1
Podcasting	7	4	5	5	1
Preference Setting	8	2	5	4	2
RSS	16	3	3	1	0
Spyware	8	3	5	3	2
Tagging	13	4	2	3	1
Weblog	13	2	6	2	0
Wiki	10	5	3	4	1

Challenges in measuring digital literacy in the senior population. Seniors have a limited understanding of Internet-related terms such as advanced search, phishing, and podcasting. Seniors use technology for a specific set of activities such as sending an email or reading the news, and thus develop specialized skills around these activities.

Conclusions
Digital literacy is particularly complex because it can only be gained through experience, but seniors often lack the experience because they are afraid of trying the technology. We term this the senior digital literacy paradox and show in our paper how understanding this paradox is critical for the development of digital literacy programs geared specifically toward the senior population. Through the lens of the senior digital literacy paradox it becomes evident that supporting seniors in their digital literacy is a complex endeavor that requires not only a focus on skills, but also on the cognitive and socio-emotional aspects of digital engagement (Haight, et al., 2014; Eshet-Alkalai, 2004).

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ADOPTION IS A QUESTION OF INTERESTS. APPROPRIATION AND DOMESTICATION PROCESSES OF SMARTWATCHES AMONG ADULT AND OLDER ADULT USERS

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Introduction

The goal of this paper is to explore the appropriation and domestication processes related to the adoption of smartwatches with a generational perspective, involving adults and older people in Italy and Spain.

Smartwatches have been a marketing trend in the last few months, but are still used by a minority of people (Kantar, 2015); this allows to explore the adoption of a device that is perceived as 'new', requiring their users to elaborate expectations, social representations, usage strategies and norms. Moreover, smartwatches, like other wearable technologies, represent powerful tools for integrating the online and the offline dimensions, with main regard to supporting users in everyday life practices (exercising, moving around their cities, etc.); with regard to older people, major attention can be devoted to health-related application (hearth-rate measuring, etc.).

Domestication processes of smartwatches: a generational perspective

In our analysis, we rely on a theoretical framework that builds on the concept of *domestication*, as well as on a *generational* perspective on digital communication tools;

moreover, we consider the ways in which social norms and usage practices are negotiated among users.

More specifically, when analysing appropriation processes, sense-giving practices and usage patterns, the domestication framework focuses on different stages. First, the initial moment of 'appropriation', during which users negotiate the meanings of a 'new' technology (or device). Second, the 'incorporation' stage, during which the new device is placed in users' homes (or, in our case, between their homes and their very body). The third stage describes the 'objectification' processes, during which the device becomes a part of users' everyday practices. Finally, during the 'conversion' stage, users elaborate on the ways in which the new device is involved in their identity performances (Silverstone and Haddon, 1996; Haddon, 2011).

In this regard, we observe an interplay between device characteristics (which can be understood in terms of affordances and constraints, Norman 2013), and user perceptions and social usage norms, that contribute to shaping individual usage practices. When each 'new' technology starts spreading, people develop specific *media ideologies:* 'people's beliefs about how a medium communicates and structures communication' (Gershon 2010, p. 21). Users develop their *idioms of practice* (Gershon 2010, p. 6) accordingly. Idioms of practice are negotiated collectively (among users and often non-users), through ongoing processes that can also include misunderstandings between users; they are not universally shared, nor are they explicit.

In building our framework, we adopt a *generational* approach, considering media platforms as 'generational contexts' (Mannheim, 1952), and focusing on the ways in which media usage can contribute to the social construction of a 'generational identity' (Colombo and Fortunati, 2011). Moreover, we are interested in exploring the ways in which the generational semantics (Corsten, 1999) produced by both adult and older users interacts with the perception of the individual relation with the 'new' device (including usage goals and skills), as well with the related social expectations.

Exploring appropriation and domestication processes of smartwatches: our research

In this paper our major focus is on individuals' elaboration of expectations, social representations, usage strategies, and norms related to a digital device that is still in its infancy in terms of adoption (Kantar, 2015) and already became popular (Nagtegaal, 2015). In order to analyse the very first steps of device appropriation, we provided a smartwatch to individuals that were not using it when we started the research.

More specifically, we provided an Android smartwatch to 14 individuals: 10 older participants (65 to 80), 5 living in Barcelona (Catalonia, Spain), 5 living in Rome (Italy); and 4 researchers of the project (37 to 44), 3 living in Barcelona and 1 in Rome. Selection criteria for older individuals were:
- Age (being 65+)
- Smartphone usage (we recruited users that were actively using a smartwatch compatible Android smartphone)

- Gender (in each city, we recruited at least 2 women)

We are aware that our own usage practices are biased by our role of researchers, but we believe that our experiences could anyway provide insights into the *generational* dimensions of appropriating and domesticating smartwatches.

We established a one-year relationship with participants, gathering information mainly by means of:
- Semi-structured interviews, every two months
- A monitoring app developed for the project, to track the activities of Android Smartwatches
- Training sessions and focus groups every six months

Therefore, our analysis is based in two complementary dimensions: the discourses around the relationship with the smartwatch, and the tracked uses (and non-uses) of the device.

More specifically, we explore the following main topics with a generational perspective:
- User expectations around smartwatches
- Appropriation and domestication processes
- Learning paths
- Specific usage (and non-usage) patterns
- Negotiations with friends and family about smartwatch usage

In this paper we discuss partial results of an ongoing project. According to our preliminary analysis, **expectations are influenced by technological trajectories;** while older participants mostly base their expectations on the impact of previous "new" technologies in their everyday life, researchers mostly base them on what they have seen about smartwatches on the media. Moreover, **personal values and ideologies influence the perception of smartwatches;** for both older adults and researchers, the smartwatch can be seen as an intrusion on private life, as a showcase of private life, as a ticket to socialize, or as a symbol of identity. These ambivalent perceptions depend more on personal values, and on relational networks, than on age. Otherwise, **technical difficulties are persistent in different ages;** there is a clear learning curve as all participants use mainly the most basic tools and/or had technical problems in the initial setup or during the first days of use. Finally, s**pecific uses are related with personal interests;** beyond time keeping and notification management, the nuanced use of the smartwatch depends on the already existing interests of each user. For instance, those who already used sports trackers on the smartphone use them on the smartwatch extensively. Others enjoy it mostly by changing the style of the screen often, or by exploring new smartphone apps.

In more general terms, we are observing a complex domestication process, that is taking place at the intersection of individual, social and technological dimensions.

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NO PLACE FOR OLD MEN (AND WOMEN): REPRESENTATIONS OF OLDER ADULT GAMERS IN MEDIA

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Video games are an important source of activity for most adults, with approximately half of all adults engaging in some form of game play via consoles, computers, and mobile devices (Duggan, 2015). Contrary to popular images, older adults, or those over the age of 50 years, are also increasingly involved in video gaming. Recent studies indicate that older adults represent more than a quarter of computer and console game playing population (ESA, 2015) and that 40% of adults between the ages of 50 and 64, and 25% of adults over the age of 65 engage in regular video game play (Duggan, 2015). At younger ages, women and men are equally as likely to engage in play, but over the age of 50, women are much more active players than men (Duggan, 2015), especially when it comes to mobile and "casual" games. Furthermore, research suggests that older adults who do play games, even minimally, are more likely to demonstrate signs of "successful aging," showing lower levels of depression, and higher levels of well-being and self-reported health (Allaire et al., 2013). These realities of older adult gaming are unlikely to be reflected in media coverage about games and their players, however, as the stereotype of the "gamer" as a young person remains prevalent (Shaw, 2013).

In general, media portrayals of aging and older adulthood generally often do not reflect the realities of daily living at older ages with accuracy. Television characters underrepresent the gender, race, and ethnicities of the older adult population (Kessler, Rakoczy & Staudinger, 2004). Moreover, representations of the older adult experience tend to be polarized into positive and negative extremes (McHugh, 2003). At one end are overly negative representations, which tend to depict older adults as physically or cognitively debilitated, and/or helpless and infantilized (Levy, Chung, Bedford & Navrazhina, 2014). In contrast, print and television advertisements frequently ascribe older adults with overly positive attributes and traits, such as happiness and wealth (Lee, Carpenter & Meyers, 2007), and suggest their lifestyles are active a health-filled, consisting of activities such as mountain hiking and beach walking (McHugh, 2003).

This polarization in media representation of the aging adult experience (McHugh, 2003) creates obstacles for older adult participation in gaming. First, it permits self-stereotyping that implicitly may limit certain social certain behaviors, such as gaming, by older adults (Cuddy & Fiske, 2004). For example, media framing of games may suggest they are not targeted to older adults, and/or simply that games are merely instrumental to improving cognitive and physical abilities rather than something to be enjoyed. Older adults may shy away from playing games because they do not see themselves as game players. Likewise, stereotypes are mechanisms to reinforce in-group and out-group status, permitting those in the out-group to be judged as different from or unequal to those in the in-group, and marginalizing those that do not fit into the stereotype (Rozanova, Northcott & McDaniel, 2006). Further compounding this issue is that representation of older adults as characters and avatars in games are scant (Williams, Martins, Consalvo & Ivory, 2009).

These stereotypes, of older adults as neither game players or the subject of game narratives is troubling, as video games have been important to bridging digital divides in the past, especially with respect to technology adoption between boys and girls (Cassell & Jenkins, 1998). So while it is possible that games might help bridge the technology gap between younger and older adults, who lag behind in internet use, broadband adoption, and online social networking (Pew Research Center, 2014), media messages may preempt these opportunities.

This study attempts to discover how are older adults are represented in mainstream media coverage about gaming. We employ a content analysis on five years of media coverage (2011-2016) of older adult game players in mainstream US print and online media outlets; these included the four major US newspapers, *The New York Times, USA Today, The Wall Street Journal,* and *The Washington Post*, and the four leading news websites as ranked by Pew Research (2015), Yahoo-ABC News Network, CNN Network, NBC News Digital, and HuffingtonPost.com. In doing so, we attempt to highlight how media representations of older adult gamers both resist and reinforce prevailing stereotypes of seniors by reinforcing the trope of aging as debilitation in physical and cognitive functioning.

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