Why It is Easier to Slay a Dragon Than to Kill a Myth About Older People's Smartphone Use

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Abstract. Our study focuses on myths about older people's smartphone use. Self-reported data, from Eurostat for example, report access rather than actual usage and are of limited use. What respondents report does not necessarily correspond with their actual smartphone usage behaviour in everyday life. We therefore conducted a tracking study to gain insight into smartphone usage among older adults. Smartphone activity logs were collected from individuals aged 60–79 (N = 303) throughout a period of 28 days between February and May 2019 in Canada, the Netherlands, Spain and Sweden. The data thus obtained on actual smartphone use were critically examined in the light of seven myths related to the smart phone usage of older people in everyday life. We also analysed the data in the context of empirical studies in the field of older people's digital behaviour. Finally, after drawing our conclusions, we present limitations and sketch implications for future research.

Keywords: Older adults · Smartphone use · Everyday life · Tracking · Digital practices · Myths

1 Introduction

It is easier to slay a dragon than to kill a myth [1]. This also applies to older people's use of digital devices. In 2012, Wandke et al. [2, p. 564] discussed and debunked the following myths related to ICT use by older people: (1) Just wait and see. Future generations of older people will use computers without problems; (2) Older people are not interested in using computers; (3) Older people consider computers to be useless and unnecessary; (4) Older people lack the physical capabilities to use ICT; (5) Older people simply cannot understand interactive computing technology; and (6) You can't teach an old dog new

tricks. In 2013, Durick et al. [3, p. 470] dispelled a number of prevailing myths about ageing in connection with technology design, stating: "Within the context of designing technology, we explore and present alternative approaches to the myths that all old people are the same; socially isolated and lonely; a burden on society; chronically ill; incapable of learning new, mainstream, technologies, and unable to use technology." In 2018, Quan-Haase et al. [4, p. 1207] deconstructed myths about the online activities, skills, and attitudes of older adults and developed a "typology that moves beyond seeing older adults as Non-Users to include Reluctants, Apprehensives, Basic Users, Go-Getters, and Savvy Users."

Our study focuses on myths related to older people's smartphone use. We first consulted statistics from Eurostat to gain insight into real life smartphone use by older people. The Eurostat data (2019) [5] showed that 73% of the EU-27 population between the ages of 16 and 74 accessed the internet on their mobile phones in 2019, a percentage that dropped to 45% when focussing on the group in the upper end of the age range, i.e., those aged between 55 and 74 years old. However, these self-reported data refer to access rather than actual usage and have limited use: the information provided by respondents in such a survey does not necessarily correspond with the reality of their actual smartphone usage behaviour in everyday life. We therefore conducted a tracking study to gain insight into the smartphone usage of older adults. To that end, we collected the smartphone activity logs from individuals aged 60–79 years old (N = 303) throughout a 28-day period between February and May 2019 in Canada, the Netherlands, Spain and Sweden, enabling us to critically examine the following myths related to older people's actual smart phone usage in everyday life:

Myth #1: Digital technologies are alien to older people
Myth #2: Older people are not able to interact with technology
Myth #3: The older the individual, the less the smartphone is used
Myth #4: Older people are a homogeneous population
Myth #5: Older people are defined by their medical conditions, creating specific digital needs
Myth #6: Older people don't use the smartphone to play, they don't need fun
Myth #7: Older people don't use their smartphone for self-representation

Our results will be presented within the context of empirical studies on smartphone usage by older people.

2   Method

The data we analyse here come from the More Year Better Lives (MYBL) research project BCONNECT@HOME [6]. A more detailed clarification of the data collection process and research design is given elsewhere [7, 8]. Here, we provide the relevant information to contextualize the obtained results. We used data that was collected by tracking the smartphone usage of a sample of older adults. The total sample was comprised of individuals aged 55 to 79 (N = 430), although in the present paper, the focus was on the older individuals between the ages of 60 to 79 (N = 303) within this group, who provided almost 900,000 logs (or valid observations) corresponding to more than 3.000

different apps. We collected the smartphone activity logs in a period of four consecutive weeks (28 days) between February and May 2019 in Canada, the Netherlands, Spain and Sweden. The geographical scope provided ample diversity in terms of internet and smartphone use in later life (see also [7]). The length of data collection allowed us to gain an in-depth picture of the everyday digital practices of the participants and to study the actual use of digital technology in daily life. This is important as it is impossible to be certain that the information provided by respondents in surveys and interviews corresponds with their actual digital behaviour. We aim to shed light on the digital practices of this group, although the selected sub-sample does not seek representativeness at the population level. The analysis we propose here relies exclusively on what can be considered a classical 'big data' analysis. Except for age, a critical dimension of our analysis, we study the smartphone logs without any other socio-demographic, contextual information. We conducted a relatively simple descriptive analysis of smartphone usage to build a robust narrative.

Usage indicators commonly rely on device screen activity. These are by-product indicators that, while less than perfect, are generally used in the field (see [7] for a discussion on the data analysed here). For instance, usage is generally measured as screen time, which is calculated by the time the screen remains active. However, use of such a proxy is not without its problems. On the one hand, the screen can turn on and remain active afterwards without an actual interaction, as when a notification pops up. On the other hand, some applications do not need screen time to run. Audio applications, such as Spotify, can run for hours but is counted as screen time only when the user turns on the application and at other scattered moments, such as when the user selects songs, channels or other sources of music.

First of all, we decided, following usual standards, to measure access as the number of times the screen turned on. Accessing apps is interpreted as evidence of usage: the higher the number of accesses, the higher the usage. Second, following a similar approach, we measured the usage time, or activity length, as the number of seconds the screen remained on once an app pops up. Both variables (number of accesses and access length) were assigned a minimum value of zero (indicating no usage) and no upper threshold (the higher the values, the higher the intensity of use). We examined the average daily usage and how this was distributed over the 24 h of the day. We also analysed the kind of apps used by the participants. We first looked into the most popular apps (either in general or within the sample) to provide analytically relevant examples. We then organised them into the following categories for a more systematic perspective on smartphone appropriation:

1. Image, Audio & Video. These are apps to create, edit or publish images, audio & video content.
2. News, Media & Publications. Refers to digital content consumption.
3. Email, Messaging & Phone. Includes instant messaging, email and calls –either regular or over IP.
4. Social Network Sites. Includes general purpose sites as well as dating sites.
5. Games. Refers to games, lotteries and gambling apps.
6. Health & Fitness. Includes trackers of physical activity and diet (calory counters), activity bracelet controllers and other health-related apps.

7. Travel, Transportation & Navigation. Refers to apps that support users during trips and commuting.
8. Productivity & Education. Consists of personal/office productivity and educational tools.
9. Weather. Refers to weather forecast apps.
10. Finance. Comprises banking, stocks management, micro-payment and PayPal-like apps.
11. Shopping. Refers to online shopping, price comparisons and loyalty apps.
12. Tools. Any tool not related to the previous categories.
13. System. Includes launchers and other apps with a transparent interface for the user (not explicit, not noticeable when in operation). The analysis will exclude this category.

3 Results

Myth #1: Digital technologies are alien to older people

Are digital technologies really alien to older people? If this were the case, why would they use the smartphone the whole day, as Fig. 1 clearly shows? The participants used their mobile phones more than 100 times per day on average. This usage is distributed over the day, curving upward from 5 AM on and remaining high until starting to decrease in the evening from 6 PM on. Usage is minimal at night (between 1 and 5 AM). We agree with Durick et al. (2013, p. 472) [3] that "(…) a lack of perceived benefit appeared to generate negative opinions of new technology. (…) older users expect a clear vision of how technology will allow them to retain their independence and achieve practical benefits that will help them maintain their everyday wellbeing. However, one could argue that this is an important to all ages."
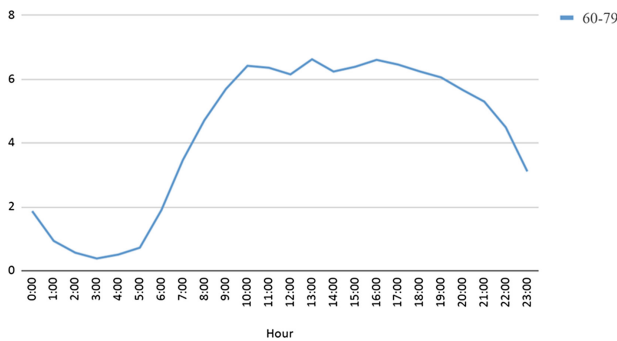

Fig. 1. Average number of accesses to smartphone apps/webs per hour (aged 60–79)

Myth #2: Older people are not able to interact with technology

Figure 1 also clearly shows that it is not true that older people are unable to master internet skills: they apparently have the internet skills to know how to access smartphone

apps/webs, as they are attached to their smartphone all day. They use their mobile phones (=screen turns on) more than 100 times per day on average. The distribution of this usage over the day shows that smartphone use is shaped by social uses of time (sleeping time, etc.). Usage rises from 5 AM in the morning and remains high until 6 PM in the evening, when it once again starts to decrease. At night (between 1 and 5 AM), usage is minimal but even then it does not totally disappear. Our findings are consistent with insights from studies such as [2–4, 9].

Myth #3: The older the individual, the less the smartphone is used

Age is generally considered to negatively affect digital engagement. Depending on factors such as attitudes, motivations and skills older people can be digitally engaged [see e.g., 4, 9]. The data in Fig. 2 and 3, split by age group (60–69 and 70–79), challenges the myth that the older old use their smartphone less than the younger old. We found no difference in usage throughout the day, nor in the duration of the smartphone session. We observed similar patterns in both cohorts: the differences are small and the curves for both age groups follow each other closely.
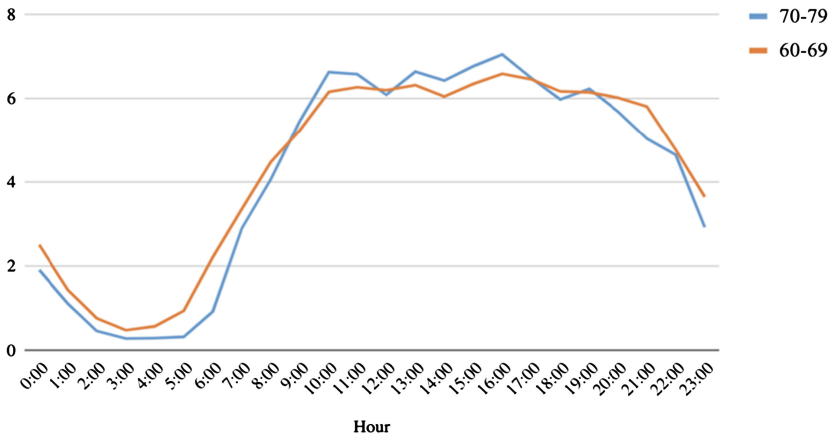

Fig. 2. Average number of accesses to smartphone apps/ webs per hour (60–69, 70–79 years old)

Myth #4: Older people are a homogeneous population

It is a myth that older people form a homogeneous group. On the contrary, older adults represent a highly heterogeneous population [4, 9–11]: the older people become, the more diverse they become as a group, a phenomenon called 'aged heterogeneity' [9–11]. Table 1 presents data from our study, highlighting the fact that different older individuals rely on different apps in daily life and use these with different intensity. The overview of selected apps clearly shows the diversity of usages and differences in popularity, which illustrates the heterogeneity in activities and communication interests mediated by the smartphone.
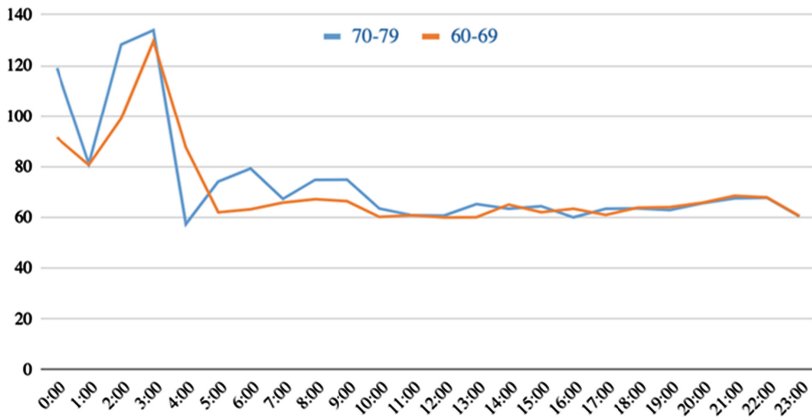
Fig. 3. Average duration of accesses to smartphone apps/webs per hour – units: seconds (60–69 years old, 70–79 years old)

Though differences in digital proficiency between users can play a role to a certain extent [12–14], it is also important to be aware of the fact that studies reporting internet use, often report average behavior, with the diversity of internet users among older adults remaining unacknowledged (see [4, 9] for a more critical approach).

Table 1. Use on average per app (60–79 years old)

	Users		Usage (on average)	
Ages: 60–79	N	%	Accesses per user in the 28-day period	Duration of accesses (seconds)
Google Maps	227	75%	15	133
WhatsApp Messenger	191	63%	300	83
Spotify Music	48	16%	14	–
Google Fit	11	4%	144	–
Pokémon GO	9	3%	351	334
Candy Crush Friends Saga	5	2%	28	655

Note: Duration of access is measured in terms of time screen. Apps as Spotify or Google Fit mostly run on the background and do not count as time screen usage

Myth #5: Older people are defined by their medical conditions, creating specific digital needs

The myth that older people are defined by their medical conditions and their digital needs (an assumption that is part of a patronizing attitude towards older adults [15]) does not hold up. We present data in Fig. 4, showing the different categories of apps used by the participants use (number of accesses during the observed period). These

very clearly show that the typology of apps used by the participants does not appear to be shaped by medical conditions alone, but also by personal interests, such as calls & messaging, using social networks, games & gambling (see also Myth #6), news & media and travel & transportation.
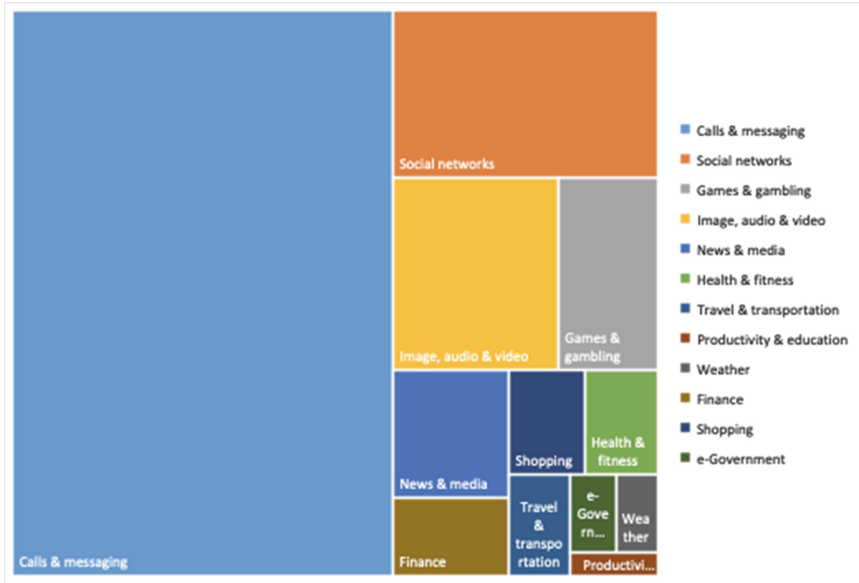

Fig. 4. Different categories of apps' use (aged 60–79)

Myth #6: Older people don't use the smartphone to play, they don't need fun
Our data clearly show that older people have fun and do play games (see for example Candy Crush and Pokémon Go in Table 1). Moreover, Fig. 4 clearly shows that "Games and Gambling" is the fourth – out of 12 – most relevant category of apps. This category is more relevant than news & media, and health & fitness apps. Though most gaming reports do not include much data on age (or any at all, see Statista [16] for Spain), there are a few examples that do provide some information about age. According to the ESA gaming report, 30% of men in the USA in the age group 55–64 play on a game console, while 31% of the women play on a tablet or a wireless device [17]. And Statista (2020), which presents the data for Sweden, shows that in Sweden, 21% of the 45–64 years old and 15% of the 65–79 years old [18] engaged in playing video games on a daily basis in 2018. In the first half of 2016, some 8% of internet users gaming online on mobile devices were aged 55 and up in the Netherlands, rising to 12% in the second half of 2016, 14% in the first half of 2017 before dropping to 11% in the 2nd half of 2017 [19].

Myth #7: Older people don't use their smartphone for self-representation
If it were true that older people do not use their smartphone for self-representation, why do they use Instagram, Facebook or even dating apps, such as Tinder? There are studies

reporting that older people are not interested in social network sites [20]. But our data in Table 2 clearly show that that older people most certainly do use social network sites. Self-representation could be one of the reasons.

Table 2. Overview of app use (60–79 years old)

Ages: 60- 79	Users		Usage (on average)	
	N	%	Accesses per user in the 28-day period	Duration of accesses (seconds)
Facebook	178	58,7	114	201
Instagram	111	36,6	67	144
Twitter	40	13,2	87	125
LinkedIn	35	11,6	18	69
Snapchat	5	1,7	58	78
Pinterest	4	1,3	23	95
Tinder	1	0,3	6	9
Nextdoor	1	0,3	1	262

4 Conclusion

We collected the smartphone activity logs from individuals aged 60–79 (N = 303) over a period of 28 days between February and May 2019 in Canada, the Netherlands, Spain and Sweden to critically examine seven myths related to older people's actual smart phone usage in everyday life. The obtained data were assessed in the light of empirical studies in the field of older people's smartphone usage. This led to the following results:

Myth #1: Digital technologies are alien to older people
Figure 1 clearly shows that on average, participants use their mobile phones more than 100 times per day. This usage is distributed throughout the day, curving upward from 5 AM in the morning and remaining high until 6 PM, when this starts to decrease. In line with the findings of Durick et al. (2013) [3], usage is minimal at night (between 1 and 5 AM). If older people are using their smartphone the whole day long, digital technologies are anything but alien to them.

Myth #2: Older people are not able to interact with technology
Figure 1 also clearly shows that older people are able to master internet skills: They apparently know how to accesses smartphone apps/webs as they are attached to their smartphone throughout the day: they use their mobile phones (=screen turns on) on average more than 100 times per day. Our findings are consistent with insights from studies such as [2–4, 9].

Myth #3: The older the individual, the less the smartphone is used
The data in Fig. 2 and 3, split by age group (60–69 and 70–79), challenges the myth

that the older old use their smartphone less. We found no differences either in usage throughout the day or in duration of the smartphone sessions during the day. We observed similar patterns in both age groups: only minor differences were seen between the groups, with neither one exceeding the other. Depending on factors such as attitudes, motivations and skills, older people can be said to be digitally engaged [see e.g., 4, 9].

Myth #4: Older people are a homogeneous population
Our findings clearly show that older people form a heterogeneous group (in line with [4, 9–11]). Table 1 presents data from our study showing that different older individuals rely on different apps in their everyday life and use these with different intensity. The overview of selected apps clearly demonstrates the diversity of usages and differences in popularity, which illustrates the heterogeneity in activities and communication interests mediated by the smartphone.

Myth #5: Older people are defined by their medical conditions, creating specific digital needs
Older people are not defined by their medical conditions and their digital needs (an assumption that is part of a patronizing attitude towards older adults [15]). Our data in Fig. 4, presenting different categories of apps used by the participants (number of accesses during the observed period), clearly show that the typology of apps would not appear to be shaped only by medical condition, but also by personal interests, such as calls & messaging, using social networks, games & gambling (see also Myth #6), news & media and travel & transportation.

Myth #6: Older people don't use the smartphone to play, they don't need fun
Most gaming reports do not include much age-related data [16, 18, 19], but our data clearly show that older people have fun and do play games (see for example Candy Crush and Pokémon Go in Table 1). Moreover, Fig. 4 clearly shows that "Games and Gambling" is the fourth – out of 12 – most relevant category of apps. It has more relevance than news & media, and health & fitness apps.

Myth #7: Older people don't use their smartphone for self-representation
There are studies reporting that older people are not interested in social network sites [20], but our data in Table 2 clearly show that they are also users of Instagram, Facebook or even dating apps such as Tinder. Self-representation could be one of the reasons.

5   Limitations and Implications for Future Research

The explorative quantitative data that we present and discuss in this paper is embed-ded in a conceptual framework that is now widely referred to as the co-constitution of ageing and technology [21, 22]. This line of research breaks away from the usual tendency to conceptualize technologies as interventions to the problems of ageing and later life, and instead studies "how the contemporary experience of aging is alreadyco-constituted by gerontechnology design, the socio-material practices it enacts, and policy discourses around innovation and aging". [23, p. 19] So far, however, most of the studies in this

emerging tradition have been qualitative, focusing in depth on particular, situated forms of ageing-technology relations in practice.

The study presented in this paper, therefore, is unique in the presentation of quantitative data to explore the co-constitution of ageing and technology. The tracking approach that we pursued allowed us to map out real world encounters of older people with technology in their everyday lives in a comparative perspective and with a large sample size. Its data thus goes beyond existing quantitative overviews that use self-reported data about the possession and use of digital technology among older people, and of smartphones in particular. This particular perspective has allowed us to provide additional understanding of the diversity and extent of digital uses based on a large sample from across four countries.

While our approach is explorative, it has allowed us to complement and thus corroborate existing qualitative studies that had already shown how digital device use by older people is more diverse than existing policy discourses around gerontechnology innovations would indicate. [24–30].

We consider this an important step towards complementing existing narrative evidence and the establishing of a broader database that we can use to inform policy making in the field. To be more precise, we argue that this study demonstrates the value of more mixed methods research in socio-gerontechnology, whereby quantitative data about digital technology use can further underpin the relevance of richer and broader narratives about ageing-technology relations. For instance, where Beneito-Montegut et al. [24] show in depth the role social media play in the everyday life and caring relations of older people, our data in relation to myth #5 (e.g., calls & messaging in Fig. 4) demonstrates that such co-constitutive relations between older people, caring and social media are indeed widespread and thus relevant. Together, then, we find an equally deep and broad evidence base to inform more creative and productive encounters of socio-gerontechnology with innovation policy or technology design.

There are of course also limitations to our approach, in particular regarding the representativeness of our sample. Our study sampled study subjects that owned a smartphone and who had previously indicated that they regularly used it. In future research, this approach can be adopted for studies in other countries than just the four in our research project and may be combined with population data to assess how widespread the passion for smartphones is in the studied population. Moreover, future research may also try to understand more specifically the relationship between digital technology use and place, so as to be able to contextualize better where and why certain apps are being used. Finally, existing qualitative studies in ageing and technology may be more systematically used to devise hypotheses about specific relations in the data, and thus move beyond the (mostly) descriptive analysis of "big data" on ageing and digital technology use.

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