



Talking ‘bout my Generation . . . or not?

The Digital Technology Life Experiences of Older People

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ABSTRACT

I argue that research on digital technologies for older people is largely failing to address two key issues: first, the lack of understanding and stereotypical views about older people by young researchers and developers; second, the tendency of researchers to treat all older people as a homogeneous group. I set out the case for the importance of digital technologies for older people, and the evidence for each of these issues, partly using a review of 102 papers on the topic from the ACM Digital Library. As one part of the way forward, I present a series of pastiche personas of older people, which young researchers and developers may find engaging and informative. Finally, I discuss strategies we might use to improve our understanding of the samples of participants we work with in developing digital technologies for older people.

CCS CONCEPTS

• Human-centered computing; • Human computer interaction (HCI); • HCI theories, concepts and models;

KEYWORDS

older people, digital technologies, life experiences, stereotypes

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1 INTRODUCTION

In this paper I will argue that research and development on digital technologies for older people is failing to address key issues and thus potentially is not serving the needs of this growing segment of the population adequately. Firstly, too many young researchers and developers working on this topic do not understand enough about the abilities and needs of older people and work from stereotypical viewpoints. Secondly, too much research treats all people over the age of 60 or 65 as one homogeneous group of “older people” (or “older adults”, “the elderly”, “elderly people”, I will use “older people” throughout this paper) without consideration for what digital technology life experiences different generations within that

group might have had. I am not wishing to attribute blame for this second issue in particular - I have been as guilty of it as the next researcher, and other disciplines studying older people, such as psychology and gerontology, struggle with similar issues. However, I want to lay out the nature of the issues and point out that as HCI researchers familiar with digital technologies and with a range of research methods at our disposal, we are particularly well-placed to understand the nature of the issues. I will suggest some positive ways we can move forward, educate (and even amuse) coming generations of researchers and improve our research methods.

It is well known that the world’s population is ageing, the only exceptions being sub-Saharan Africa and parts of Oceania [58]. To illustrate the magnitude of the problem, the United Nations estimates that in 2020 there were 727 million people aged 65 or over (a crude, but widely used definition for “older people”), approximately 9.3% of the total population. By 2050 it is estimated that the number will increase to 1.5 billion people, approximately 16.0% of the population [58]. Japan has long been acknowledged as the country with the oldest population, with nearly 30% of the population 65 or older. A number of European countries also have particularly old populations, notably Italy (22.8%) and Finland (21.9%). China, although it currently has a much lower percentage of older people (approximately 13.5%) will also face enormous growth in this area, with an estimated increase to 35% of the population aged 65 or over by 2050, or 400 million people [42]. This is due to the same demographic issues affecting the rest of the world (e.g. longer life expectancy due to better sanitation, nutrition and healthcare) but also the one child policy which existed in China between 1980 and 2015 [11].

What is more interesting and important than the raw numbers or percentages of older people in a population is the Potential Support Ratio (PSR). This is the ratio of the number of people of working age (i.e. those who produce most of the wealth and value in a society and who are also available to care for older people who need support) to the number of older people. Europe currently has a PSR of approximately four adults of working age to each older person, but the United Nations estimates this will drop to approximately two adults of working age for each older person by 2050 [58]. Even though China currently has approximately six adults of working age for each older person, the Chinese PSR ratio is predicted to drop to the same low level as Europe by 2050 [58].

Clearly this change in the demographic make-up of society will have profound implications, many of which we are already beginning to see, for example pressure on healthcare systems as older people, who although they are living longer, are more likely to have health issues than younger people [62], pressure on housing availability and pressure on social care systems. The importance for the HCI community is the development of many digital technologies to

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support older people, to replace the disappearing younger people. Such technology is often seen as a panacea for the problems of how to care for the growing number of older people, both physically and psychologically.

There has already been considerable research into the use of digital technology to support older people from very general systems, such as smart home systems [34] to very specific systems, such as medication reminder systems [61]. Some research is investigating how to deploy what might be thought of as mainstream technologies, such as smartphones [28] or social network sites [46] and some research is looking to create new technologies specifically for older people, such as personal alarm systems [34] and companion robots [2]. Reviews of the current state of research can be found in sources such as Khosravi & Ghapanchi [29], Mostaghel [41] and Petrie & Darzentas [49]. Some of the research is taking a human-centred or participatory design approach, of which the HCI community would approve, but much of it is taking a more “technology push” approach, creating solutions which researchers and developers think older people will benefit from, but without involving them in the design and development process. However, this is not the issue I wish to address here, important though it is, although the two issues I will address may well feed into this problem.

2 AGEISM IN DIGITAL TECHNOLOGY RESEARCH FOR OLDER PEOPLE

The lack of understanding of older people and stereotypic view about this group is often referred to as ageism. In the digital technology domain, the emphasis of discussions around this topic has generally been on the problems of older workers or researchers facing discrimination due to their age. For example, a survey in the UK in 2019 found that 41% of IT and technology sector workers reported having observed age discrimination in the workplace, compared to 27% across other UK industry sectors. Workers reported experiencing ageism from the age of 29 and being considered “too old” for the industry by the age of 38 [55]. This is extremely important and depressing, but I am concerned with the attitudes of these young workers and researchers towards the older people for whom they might be developing digital technologies rather than towards their fellow workers. As the older population grows and the PSR shrinks, we will need more and more people to work on digital technologies for the older population, and it will no longer be a niche domain it is at the moment. Yet developers in their 20s and 30s, who dominate the digital technology world, often have little understanding of and experience with older people. They may have several grandparents in this age group, and their views may be overly influenced by those individuals.

A considerable body of research has investigated the ageist attitudes of students and young people in many professions and cultural contexts: nursing students in Australia [20], South Korea [25], and Turkey [3], social work students in the UK [53], speech pathology students in the USA [24], arts and science undergraduate students in India [13] and young people in general in Italy [17]. A cross-cultural study in Thailand and the USA [35] found that young workers in both countries held ageist views about older workers

and in particular that older workers would be more uncomfortable with new technology. These ageist attitudes follow those of society in general, which have only increased since the COVID-19 pandemic [1].

However, few empirical studies could be found of the attitudes of young people in the digital technology world towards older people they might be developing for. One such group of studies [12, 22, 48] used a technique which can also be useful in raising awareness and educating students and young people about ageism. Participants are each shown one photo of a person and asked to rate how likely the person is to use and be expert in a range of digital technologies. Different participants in a group are given photos of young and older people, men and women. Ratings of use and expertise for these groups can then be compared (and potentially discussed in a class). Petrie [48] found highly ageist attitudes amongst young computer science students in the UK, Chen and Petrie [12] found very similar results amongst young technology students and workers in China. In both cases participants thought an older person was significantly less likely to use three kinds of digital technology (desktop computer, laptop computer and smartphone) and to be less expert with it. Haslwanter & Takas [22] extended the method by also asking Austrian computer science students what aspects of design would they consider for the person in the photo. The results on this aspect were more encouraging, with students suggesting appropriate accessibility adaptations for interactive systems.

Nonetheless, overall, the small body of relevant research backs up my perception of teaching computer science and web design students that young people in the technology world have ageist and stereotypical views of older people.

3 OLDER PEOPLE ARE NOT A HOMOGENEOUS GROUP

The other issue I wish to address is that in research we treat “older people” as anyone over the chronological age of 60 or 65, and as a homogeneous group, or at best a group with individual differences which we cannot possibly tease out. To substantiate my intuition about this issue I undertook a small review of recent papers about technology for older people in the ACM Digital Library. I searched between 2020 and 2022 for papers about older people¹ in the title or abstract (and published in English). One of the reasons for choosing a limited time span was I was expecting to be overwhelmed by the number of papers. In fact, I found only 102 papers, which was surprisingly few. I cross-checked my results by searching through the CHI and ASSETS conference proceedings manually and did not find I had missed any papers. So, my first observation is that given the societal importance of developing technology to support older people, I was somewhat shocked not to find more research being conducted by HCI and CS researchers. A comparison with research on technology for people with visual impairments shows more than double the number of papers in the ACM Digital Library in the same period: 266²; I fully support HCI and CS research on visual impairment, but the imbalance between the two topics is

¹Search string was “old people” OR “older people” OR “old adult” OR “older adult” OR “senior citizen” OR “old person” OR “older persons” OR “elderly”

²Search string was “blind” OR “partially sighted” OR “visually disabled” OR “visually impaired” OR “visually handicapped”.

perplexing. Is the smaller number of studies perhaps a problem of the COVID-19 pandemic, that it has been more difficult to do research particularly with older people, due to their vulnerability to the disease (something I should perhaps have considered before I chose the last three years to review)? However, a check of papers with older people during the three-year periods prior to the pandemic (2017 – 2019 and 2014 – 2016 revealed 118 papers in 2017 – 2019, and 101 papers in 2014 – 2016. This suggests only a slight dip in publications, quite possibly due to conducting research with older participants during the pandemic.

Of the 102 papers, 62 included user studies or surveys with older participants, a total of 79 studies (as a number of papers reported more than one study). 64 of the studies included the age range of the participants or at least the minimum age for inclusion of participants (55 gave an age range, 9 gave only a minimum age). One of the problems of research about older people is that there is no set definition of when old age starts. For example, the United Nations uses both 60 and 65 years as the minimum age in different documents (e.g. [58] uses 65 whereas [59] states that the UN definition is 60). Researchers in other disciplines working with older people face a similar lack of consistency in defining the target group and there may well be different reasonable definitions in different parts of the world, given different retirement ages, life expectancies and cultural expectations. Some HCI researchers have attempted to adjust for different retirement ages and life spans in different parts of the world by calculating the percentage of the lifespan spent in retirement [26, 36]. This is an interesting idea, and may be useful in some research contexts.

Some of the studies stated only that participants were over 60 or 65, several studies gave no information about how they defined the older population at all, or only gave an implicit definition by mentioning ages in relation to previous research [33, 38, 39]. The youngest minimum age for “older” was 47 years. However, this was a slight anomaly. It occurred in a paper about support for women around the menopause [44], which as the authors noted, occurs between the ages of 45 and 55 for women in the UK [31]. However, referring to women in the age span of 45 to 55 as “older women” while understandable, but perhaps not the best choice. There were also five papers [6, 15, 21, 40, 45] which defined older adults from ages in the 50s, which still seems very young. These studies were conducted in China, Germany, Japan, the UK and the USA, so there is not particular cultural pattern. However, most studies (53 out of the 62, 85.5%) gave a minimum age in the 60s, with further three studies giving an age in the 70s and two an age in the 80s.

However, the more interesting statistic is the age range of participants and what span of years that represents. The mean age range was from 62.7 to 83.3 years, a span of 20.7 years. Common sense suggests that the “typical” 63 year old is very different from the “typical” 83 year old, a point to which I will return later. The widest age span was 39 years (from 50 to “over 80” or “80s”) in two studies, one conducted in China and one in Japan [6, 40]. Again, the “typical” 50 year old is probably very different from the “typical” 85 year old. Only five studies provided any information about the numbers of participants in different age bands within their age range. These were all survey studies with large numbers of participants. These five studies did use the age bands in their analyses, although often in a tangential way (for example, not having a research question or

hypothesis about age differences), three found significant effects for age [5, 6], however two did not [23, 63]. However, a further 10 studies with large numbers of participants could perhaps have investigated for differences between participants of different age groups within the “older people” group, but did not [e.g. 4, 32, 33].

In other disciplines, particularly the social and clinical sciences, researchers frequently divide the “older people” group into a number of subgroups. Neugarten [43] started this trend by proposing that older people could be considered the “young-old” and the “old-old”. She proposed this group to be 55 to 75 year olds, although confusingly, she also had a group of 64 to 74 year olds in her paper. The young-old is now usually considered to be 65 to 74 year olds (it is notable that over time, the minimum age for older is being pushed back) and the “old-old”, those 75 and over. This was not an arbitrary division, but based on a broad analysis of characteristics and lifestyles. Neugarten characterized young-old Americans as “healthy, relatively affluent, relatively free from traditional responsibilities of work and family . . . well educated and politically active” (p187) (bear in mind she was writing in the USA in 1974). She does not provide a characterization of the old-old. Since then, researchers have also adopted more fine grained distinctions, very frequently “young-old” (65 to 74), “old” (75 – 84), and “old-old” (over 84, sometimes over 80) and sometimes “oldest-old” (over 95). These terms are also sometimes used by HCI researchers. While this may help tease out meaningful differences between successive ages groups of older people, there may be better ways for researchers interested in digital technologies to categorize people over the age of 60 in ways that are relevant to our research domain.

Several of the studies I reviewed did attempt some interesting measures to investigate individual and perhaps age-related differences relevant to digital technologies and human-computer interaction further. For example, Kropczynski et al [30] asked older participants to complete a questionnaire about “power usage” of technology as a measure of their general level of digital technology expertise [57]. They state that this measure was “pre-validated”, but in fact it does not appear to have gone through a full psychometric development process. Pena et al. [47] established that their participants were “older active ICT users” (as defined by Kania-Lundholm & Torres [27]) using a number of simple indicators: owning one or more computing devices, using them most days, and using email to communicate with the researchers. These are useful criteria, and although they do not make a dimension of ICT activity, may serve a useful purpose in many circumstances and could be built up into a scale which could be validated. Valtolina & Hu [60] also used simple but effective indicators of digital technology experience by establishing that all their participants had a smartphone and used it to chat, see videos on YouTube, and browse the Web.

While the distinctions used in other disciplines group age bands of old people in ways which are important to their research, with some HCI studies we see some attempts to group older people according to the use and expertise with digital technology use. Before pursuing that line of argument further, let us consider the range of digital technologies that older people of different ages might well have had experience with (at least those older people in developed countries) and for how long. As Pena et al. [47] note, cohorts of older people who are now reaching old age may have experienced prolonged exposure to digital technologies during their

Table 1: Years of major life milestones for a person currently 62 and 83 years old in a developed country

Birth	Start School (age 5)	Finish school (age 18)	Retire (age 65)
1938	1943	1956	2003
1958	1963	1976	2023

Table 2: Timeline of widespread use of key digital technologies in developed countries

1980s	1990s	1990s	2000s	2020s
PCs	WWW	Smartphones	Virtual assistants	Video conferencing for work and leisure
Mobile phones	email	Social media	Apps	

Table 3: Major life periods of a hypothetical person currently 83 years old in comparison to the digital age

	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	2010s	2020s
School										
Working										
Digital Age										

lives, so assumptions that they are inexperienced with these technologies based on the lack of familiarity with them are becoming increasingly weak.

4 THE DIGITAL TECHNOLOGY LIFE EXPERIENCES OF CURRENTLY OLDER PEOPLE

Given that the papers I reviewed worked with participants of a typical age range from 63 to 83 years old, let us now consider what kinds of digital technologies they might have experienced through their lives. I will restrict myself to what might be typical experience for relatively affluent people in developed regions of the world such as North America, Western and Northern Europe and Australasia. It is generally agreed that the current “digital age” started with the widespread use of personal computers (PCs) for both business and personal purposes in the 1980s, with the terms “digital age”, “digital era” and “digital society” (as well as many other terms) appearing in academic papers from 1982 onwards (digital technology as a term was used from the 1960s in technical papers) [52]. Table 1 shows in very general terms the timeline of widespread use of a number of key digital technologies that have been very influential in work and personal life (there are numerous other digital technologies which might be added to this timeline) from approximately 1980 until the present. Note that I say “widespread use”, not invention, as I am interested when anyone might have encountered these technologies. I will refer to this period as the “digital age”. Table 2 shows the approximate years for major life milestones for a “typical” person who is now about 63 and a “typical” person who is about 83 (I took these to be their ages in 2021, the middle of my review period of papers).

Tables 3 and 4 map these milestones on to the evolving digital age. We can see that for the 83 year old person, they started work well before the digital age; indeed about half their working life would


have occurred before they were likely to have encountered any digital technologies in either their work or personal lives (unless they were real geeks). However, for the 63 year old, although they probably started work a little before the beginning of the digital age, for most of their working life, they might well have encountered digital technologies in their work and personal lives. So, we would not consider them “digital natives”, but “digital immigrants”, to use the terminology proposed by Prensky [50].

5 PASTICHE PERSONAS TO EDUCATE AND ENTERTAIN YOUNG STUDENTS AND DEVELOPERS

While the tables in the previous section are interesting in terms of showing how people of different ages might have encountered digital technologies, they fail to bring those people to life or to provide any concrete richness of their life experiences. To change the ageist attitudes of young students and digital technology developers, one needs engaging as well as educational material. HCI has long used personas to try to bring to life different potential users of digital technologies [14], and there has been work on personas to represent older people [51] and older people with disabilities [19]. However, for education and awareness raising purposes, I felt that creating personas about anonymous older people would not be engaging for young students and developers. So, inspired by the ideas of design fictions [7] and pastiche scenarios [8], I decided to create “pastiche personas” of older people. These are based around real people of appropriate ages that young students and developers would recognize and possibly know something about, although I have imagined and definitely played around with their digital technology life experiences. The following figures and tables illustrate some of the personas and the mapping of their life milestones to the digital age. I have not yet attempted to subdivide the digital age into meaningful stages, but I believe that could be useful. It may

Table 4: Major life periods of a hypothetical person currently 63 years old in comparison to the digital age

	1960s	1970s	1980s	1990s	2000s	2010s	2020s
School							
Working							
Digital Age							



Liz W.

Biography

Born: 1926
School: 1931 – 1944
Started work: 1944, aged 18
Career: Worked as a secretary
 Rose through various positions to be
 Personal Assistant to Senior CEO
Retired: 1986, aged 60
Currently: would have been 97 in 2023

Digital technology life experience

- Used an electric golfball typewriter at work
- Retired just before PCs were introduced to the office, so no experience of digital technology through work
- Has two grandsons (William and Harry) who have taught her about the web and social media and stimulated her interest in digital technologies
- In retirement was an early adopter of email
- Uses a smartphone mainly for voice calls
- Sends the occasional tweet and occasionally posts on Instagram
- Used Zoom during the pandemic

Figure 1: Pastiche persona for a person in their 90s, Liz W. (CC BY 4.0. New Zealand Government, Office of the Governor-General - [https://gg.govt.nz/image-galleries/9259/media?page=\\$2](https://gg.govt.nz/image-galleries/9259/media?page=$2))

Table 5: Mapping of Liz W's milestones on to the digital technology age

	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	2010s	2020s
School										
Working										
Digital Age										

be that older people who experienced the digital age from its start will have the longest experience with digital technologies, but will have a “desktop computing” mindset rather than a “smartphone” mindset. This will be a topic for future research.

Figure 1 shows the pastiche persona for Liz W, a lady well into her 90s (sadly no longer with us). We can see from the mapping in Table 5 that her education and working life were all before the digital technology age. Thus, she had no experience of digital technologies until after her retirement. However, she took a keen interest in digital technologies, probably through the encouragement of her grandchildren (who are digital natives, born in 1982 and 1984) and used numerous digital technologies and applications. Like many

older people, she started using video conferencing applications such as Zoom during the pandemic and was a very competent user.

Figure 2 shows the pastiche persona for Mick J, a man just entering his 80s and Table 6 shows the mapping of his milestones to the digital age. By making it clear that Mick J., although younger than Liz W., and a man, is much less technologically interested and experienced than she is. So, while chronological age may give an indication of digital technology experience, it is important to emphasize the individual motivations and interests are also vitally important. These are issues which can be drawn out in a discussion about a wider range of personas.


	<p>Mick J.</p> <p>Biography</p> <p>Born: 1943 School: 1948 - 1959 Started work: 1959, aged 16 Career: Started as an office boy Drifted through various positions, ended up as a used car salesperson Retired: 2008, aged 65 Currently: 80 in 2023</p>
Digital technology life experience	
<ul style="list-style-type: none"> • His schooling was before the digital age, and he wasn't paying much attention at school anyway • Used a PC a bit in various jobs, but changed jobs frequently and never bothered to attend the training sessions • Has numerous grandchildren and great grandchildren, but spends little time with them, so they have not been able to interest him in digital technologies • In the pandemic, he discovered Instagram as an outlet for the photographs he likes to take and share 	

Figure 2: Pastiche persona for a person entering their 80s, Mick J. (CC BY-SA 3.0)

Table 6: Mapping of Mick J's milestones on to the digital technology age

	1940s	1950s	1960s	1970s	1980s	1990s	2000s	2010s	2020s
School									
Working									
Digital Age									


	<p>Barry O.</p> <p>Biography</p> <p>Born: 1961 School: 1966 - 1979 Started work: 1979, aged 18 Career: Started as a dishwasher in restaurants to fund his studies. Now owns a chain of hotels, golf courses, casinos, many other businesses (possible confusion with someone else here). Retire: May retire in 2026, aged 65 Currently: 62 in 2023</p>
Digital technology life experience	
<ul style="list-style-type: none"> • Started using PCs for writing and research in college • Wrote his dissertation on a simple word processor • Started exploring the Web and using email as a researcher • Bought a mobile phone and a smartphone as soon as he could afford them • Has a website, Facebook and Instagram accounts and has Alexa both at home and in the office • Never seen without his smartphone, as he has become completely dependent on it 	

Figure 3: Pastiche persona for a person entering their 80s, Mick J. [Public Domain]

Table 7: Mapping of Barry O's milestones on to the digital technology age

	1960s	1970s	1980s	1990s	2000s	2010s	2020s
School							
Working							
Digital Age							

Finally Figure 3 and Table 7 show the persona and milestones for, Barry O., someone just entering old age. In this age group there is also wide variety of motivations and interests in digital technologies, which would be very important to draw out, so this persona can be complemented by one of someone of a similar age with little interest in these technologies. However, to show someone who is reaching old age but wishes to keep using the technologies they have grown accustomed to during their adult life, I consider very important.

In early 2023 I will be teaching a large class of first year undergraduate computer science students taking an introductory HCI course. I will use a range of these personas and conduct an evaluation of the students' reactions to them and investigate whether the personas change their attitudes to older potential users for whom they might developing digital technologies.

6 MOVING TOWARDS A MORE NUANCED APPROACH TO RESEARCH WITH OLDER PEOPLE

In this paper I have argued that in research and development we have not been adequately addressing two key issues in relation to the development of digital technologies for older people, the lack of understanding on the part of the largely young researchers and developers about this user group and our tendency to treat all participants 60 or 65 years and older as one homogeneous group. I believe both these issues will impede the development of digital technologies which support the abilities and needs of older people adequately. Have set out my evidence for the existence of these two issues, during which I began to hint at some of the solutions to the second issue, I proposed the idea of using pastiche personas of a range of older people of different age bands and with different motivations and interests in digital technologies to raise awareness and educate particularly young students and developers. Personas are a well known tool from the HCI methodology toolkit and pastiche scenarios and design fictions have been widely used and discussed in HCI [7]. Undoubtedly there are other techniques we can use in educating young HCI students, practitioners and researchers in understanding the abilities and needs of older people and of the importance of developing digital technologies for this potential user group of growing importance.

However, I have not yet elaborated on how to address the issue of treating older people as one homogeneous group in our research studies. At the very least, researchers need to think about the consequences of the type of sample of older people they are working with and articulate more the strengths and weaknesses of the sample in their papers. On the one hand, a good argument can be made for working with a quite narrow age group and investigating their experience and attitudes to digital technologies in some detail. I

think there is a perception that a sample with a wider age range is somehow better in a research study, but in fact it may be adding more unexplained variance ("noise") in the results due to the variation in life experiences of people of different ages. On the other hand, if a wide age range is used, then large sample sizes are needed with a balance between participants in different age bands in order to obtain meaningful results. This can be particularly difficult to achieve when working with older participants: it is often quite easy to recruit participants who are in their 60s and early 70s, but much harder to recruit participants in their late 70s and beyond. It is notable (and understandable) that the two studies in my review which worked with participants 80 years and older [10, 16] both had very small samples (6 and 10 participants respectively).

In addition to greater reflection on the nature and size of our samples, we need a range of tools to be able to relatively easily assess older participants' digital technology experiences, as well as aspects such as their motivation and interest in these technologies. Several of the studies discussed above [30, 47, 60] attempted to investigate the digital technology life experiences of their participants in different ways. The "power usage" scale [57] is an interesting idea, but needs to be validated with appropriate psychometric methods on large samples of older people in different countries. A simpler solution would be to have checklists of different digital technologies, applications, and scenarios of use, which participants can be asked about in order to assess their level of digital technology use and expertise. When I started work on this paper, I was attracted to the idea of grouping older people into the equivalent of the young-old, old, and oldest-old as is frequently done in psychological and clinical research, but based on people's digital technology life experiences, rather than just their chronological age and general health and social factors. However, this now seems an impossible task, as the range of technologies and experience is so varied. But as people who have deeper and different experiences of digital technologies enter older age, there may be possibilities for grouping them in relatively meaningful ways. As mentioned above, I think there is a broad difference between people who first experienced digital technologies through the use of PCs, those whose first experience was in the age of the Web and those whose first experience was in the age of smartphones. There are different ways of interacting with technology based on one's first exposure which can be explored for how they affect people's persistent mental models of how interaction should work. These might form an interesting basis for different groups of users.

So finally, when we conduct research with older people, perhaps we just need to remember whether we are really talking about their generation, because in the words of the now 78 year old Pete Townsend of The Who:

People try to put us d-down (talkin' 'bout my generation)

Just because we get around (talkin' 'bout my generation)

Things they do look awful c-c-cold (talkin' 'bout my generation)

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