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Editorial

Communication for Seniors' Inclusion in Today's Society: The Effects of Digitisation on Active Ageing

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Abstract

The progressive ageing of developed societies requires strategies and tools to ensure the well-being of older adults. The new communication paradigm offers ways to reduce the stigma associated with ageing and to improve the quality of life for older adults, but it can also create a dynamic that could put their inclusion at risk. The internet has fomented digital gaps that have exacerbated some of the exclusionary barriers faced by many older adults, while allowing a considerable number of others to maintain emotional ties with loved ones during the worst moments of the pandemic. This thematic issue addresses the different opportunities offered by Information and Communication Technology in improving the social inclusion and quality of life of seniors, but it also considers the risks that digitisation may pose by limiting certain rights of this group. Through the different articles in this issue, the repercussions of communication on the management of ageing are highlighted from different perspectives and methodological approaches. In this way, the complexity of the issue has been revealed, along with the need to address it from positive and constructive perspectives that reassess the role of older adults in the societies in which they live.

Keywords

active ageing; digital inclusion; digital literacy; digitisation; older adults; seniors; communication; technological skills

Issue

This editorial is part of the issue "Communication for Seniors' Inclusion in Today's Society" edited by Leopoldo Abad-Alcalá (CEU San Pablo University), Carmen Llorente-Barroso (Complutense University of Madrid), and Fausto Colombo (Università Cattolica del Sacro Cuore).

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1. Introduction

The exponential ageing of the world's population, which is due to the increasing longevity of individuals, has prompted developed societies to design strategies that will ensure the well-being of older adults (WHO, 2021). Beyond the justifiable concern for the economic sustainability of these well-developed systems, the required involvement of older adults in citizenship and social participation has started to be re-established from different perspectives. Nevertheless, digitisation has curtailed the interaction and participation of many seniors who are at risk of social exclusion, at least in cases

where they lack sufficient digital capital. Thus, the digital divide has exacerbated the inequalities already affecting this vulnerable group (Mihelj et al., 2019). Despite this situation, the positive influence that Information and Communication Technology (ICT) can have on the quality of life of older adults and, consequently, on the promotion of active, healthy and inclusive ageing has also been pointed out (Colombo et al., 2015; Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023). Thus, digital literacy is highly important for this demographic group (Abad-Alcalá, 2014), as well as the need to implement strategies that inspire their civic participation (Ferrucci et al., 2020).

Given the context, this thematic issue analyses and reflects on the opportunities offered by the internet and ICT in improving the quality of life of older people and contributing to their social inclusion. From highly diverse and sometimes hybrid approaches, a total of 10 articles have been collected, which explore variables that have an impact on the digital inclusion and social participation of older adults. There are writings that insist on the necessary involvement of public institutions in order to standardise a positive digital experience among silver surfers. Other articles suggest digital literacy initiatives and/or non-formal support to promote the true acquisition of technological skills by the older population.

2. ICT as an Instrument for Inclusion and Participation by Older People

Research on the digital divide has identified up to three levels that intensify the inequalities already affecting the most vulnerable demographic groups (Mihelj et al., 2019). These gaps include the following levels: differences in access to digital resources, or the first level divide (van-Deursen & van-Dijk, 2019); general digital skills and use of ICT, or the second level divide (Hargittai, 2002); and benefits resulting from the use of ICT at the social, economic, cultural, and personal levels, or the third level divide (van-Deursen & Helsper, 2018). Older adults are one of the audiences most severely impacted by these digital divides, but they show an increasingly positive attitude toward technology, as they are gradually discovering the social, economic, personal, and cultural benefits of using ICT (van-Deursen & Helsper, 2018). In this regard, the potential of digitisation in promoting active ageing, which is beneficial for developed societies, has also been highlighted (Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023).

To better understand the impact of these gaps on the senior population, the article by Carlo and Buscicchio (2023) shows how previous professions and the current employment status of seniors (retired or active) have an impact on their use of the internet and ICT in their home environment. For their part, the results of Papí-Gálvez and La Parra-Casado (2023) suggest that socio-demographic aspects such as education, purchasing power, age, and gender have an influence on the status of participants with regard to the digital divide, and that the family context, as well as the characteristics of some digital service providers, explain the digital and social exclusion of some of these adults.

On the other hand, the digital divide does not affect all older adults in the same way. Various studies have found intra-generational inequalities that identify different clusters of older internet navigators according to the uses they make of technology (Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023; Vulpe & Crăciun, 2020), cybersecurity concerns (Elueze & Quan-Haase, 2018), online shopping habits (Viñarás-Abad et al., 2022), and their use of e-government (Sánchez-Valle et al.,

2022). Fernández-Ardèvol et al. (2023) have identified three styles of mobile practices among these individuals, ranging from the most sophisticated (diversified and advanced uses of the mobile phone) to the most restrictive (simpler uses). These results provide valuable information that can be used to focus policies on promoting more effective inclusion of the senior population.

The classifications of silver surfers reflect diversity in their digital capital that must be addressed so that the most vulnerable older adults are not left out of contemporary society. The TechSAGE model works in this area, and is intended to be an operational initiative to promote the age-friendly redesign of ICT (Mitzner et al., 2018). Within this thematic issue, Ferrer-Mavárez et al. (2023) propose the redesign of an employment web portal for older adults (Servisenior) from a UX methodological perspective based on user-centred design. As such, these authors offer a way to enhance the usability and universal accessibility of inclusive digital tools in workspaces.

Social media have been designed as a space for the digital participation of users, which can also contribute significantly to their inclusion. These applications have improved the digital capital of older adults (Hsu et al., 2021; O'Brien et al., 2021) by enhancing their well-being and independence (Simons et al., 2021). In addition, social networks have been established as a shared virtual space for the exchange of ideas and citizen participation. Specifically, the limited empirical analysis of the involvement of older adults in the socio-political discourse on social networks has encouraged research by Sánchez-Valle (2023). Her results reveal that seniors' negative perceptions of the information and opportunities for socio-political participation on social networks are related to the dissemination of fake news, while their positive perceptions are linked to the interaction with other users enabled by such networks.

3. Institutional involvement in the promotion of active ageing

In order to prevent the digital and social exclusion of certain older adults from completing tasks that are essential nowadays, such as e-government and e-commerce (Sánchez-Valle et al., 2022; Viñarás-Abad et al., 2022), it is necessary to involve both companies and public institutions. Several of the articles included in this thematic edition have carried out research along these lines.

Olsson and Viscovi (2023) have focused their research on the relationship that Swedish public institutions develop with their citizens over 65 years of age, with the slogan "digital first." Their results show that the three levels of the digital divide, which are access, use, and outcomes, are related to the citizens' access to resources that are material, discursive, and social, as well as to their age and previous experience with computer devices.

Rivoir and Reilly (2023) explore the results of a digital literacy programme based on the experiences of older

adults with Uruguay's new National Comprehensive Health System (SNIS). The study proposes potential digital literacy initiatives that would allow older people to understand and use computerized health systems effectively.

Kolotouchkina et al. (2023) offer an empirical-conceptual view on the commitment of governments toward achieving the digital inclusion of older adults in the process of making a digital transition of cities toward age-friendly models. Their results reveal the need to develop a coordinated plan of action to achieve the following: foster digital literacy among older adults; standardize a positive digital experience among these users; and help them break down the barriers that ageism has imposed on the digital environment.

4. Training Required to Promote the E-Inclusion of Seniors

Along with an ageing population, developed societies have witnessed extraordinary advances in ICT that have made the digital literacy of older adults a priority, in order to allow them to adapt effectively to technological changes (Abad-Alcalá, 2014). Recent studies on this issue point to training models that combine self-regulated learning with guided literacy blocks adapted to different profiles of older adults, according to their level of digital competence (Schlomann et al., 2022). In this regard, online gaming may emerge as a method for improving the digital capital of this social group. Regalado et al. (2023) assess the impact of older adults' participation in digital games on active and healthy ageing. Their findings show a positive influence from such games, as well as online communities, in fostering the participation of older people in society, their acquisition of digital competence (informational, communicative, and security skills), and their well-being.

In general, ICT-mediated learning has had a positive impact on the emotional well-being of older adults (Llorente-Barroso et al., 2022). Social networks also play an important role in older adults' digital learning, due to the fact that they foster social contact, which promotes shared and reciprocal learning among seniors, and the result is a positive impact on their quality of life (Caliandro et al., 2021). Along these lines, Korpela et al. (2023) examine informal digital peer support to promote the social inclusion of older adults in Finland. Their results suggest that this type of learning is perceived by seniors as an opportunity to strengthen bonds between peers of a similar age or life situation.

5. Conclusions

The research gathered for this thematic issue has helped increase the knowledge base regarding the implications of multiple and hybrid communication practices for the digital and social inclusion of older adults. Firstly, by using diverse methodologies, the studies herein offer

approaches that explore the opportunities provided by ICT as tools for the digital inclusion and social participation of older adults. The second block of studies addresses the necessary involvement of public institutions in making a commitment to active ageing, in order to contribute to their social inclusion through the opportunities offered by new forms of communication. Finally, research has also been included that explores the possibilities offered by digital literacy in providing older adults with the technological skills and social support necessary for them to open doors and participate in today's society.

It is difficult to outline priorities for action in the field of digital communication aimed at improving the quality of life and inclusion of older adults. In fact, several of the contributions included in this thematic issue address more than one of the topics discussed above. However, what is clear is the importance of continuing to work on recognising older adults as one of the pillars of developed societies, who should be involved in all the dynamics of citizenship.

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Conflict of Interests

The authors declare that there is no conflict of interest involved in the work herein.

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Article

Digital Ageism: Emerging Challenges and Best Practices of Age-Friendly Digital Urban Governance

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Abstract

The ageing of urban populations poses serious challenges for policymakers and urban planners alike. While the number of people over 65 is increasing in urban areas, the digital transition in cities raises concerns about the persisting digital divide facing older citizens, as well as the digital inequality and ageism inherent to most digital domains. As ageing in place and place attachment play a significant role in the social engagement and well-being of older people, the purpose of this research is to shed light on the novel approaches taken by local governments to foster active participation among senior residents in the digital public sphere. Using semi-structured interviews with public officials from three age-friendly cities in Spain, we have explored innovative urban projects for digital inclusion, active ageing, and autonomy for older people. The findings of the study reveal the importance of coordinated multi-stakeholder initiatives in promoting digital literacy and overcoming barriers rooted in ageism in the digital world. True representation of older people in local governments, the promotion of co-creation initiatives led by seniors, and the standardisation of universal design and accessibility are some of the key contributions made by Spanish cities in their transition toward places that are digitally inclusive and age-friendly.

Keywords

age-friendly cities; digital ageism; digital divide; digital inclusion; digital inequality; older people; Spain

Issue

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1. Introduction

The number of people over the age of 65 is expected to grow until the year 2050, reaching one in six on a global scale and one in four in the Organisation for Economic Co-operation and Development (OECD, 2015; United Nations, 2022). Consequently, the ageing population will have a major influence on urban areas. Over 43% of all people aged 65 and over now live in cities, and the urban population is expected to increase to 6,7 billion people by 2050 (OECD, 2015; United Nations, 2018).

The impact of this demographic shift on the ability of cities to become places that are age-friendly and inclusive in the face of economic globalisation, budget cuts in public spending, austerity policies,

and privatisation of public services, is increasingly under scrutiny (Buffel & Phillipson, 2016; Galcanova & Sykorova, 2015; Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023). According to Phillipson and Grenier (2021), an especially negative impact on the lives of people over 65 has resulted from the trend toward urbanisation from the beginning of the 21st century, due to the fact that the main resources and benefits of living in the city have become unaffordable and out of reach for seniors. Age segregation and gentrification in urban communities, the invisibility of older people in the urban economy and city planning, the privatisation of public spaces, and vulnerability to climate change are clear evidence of a series of crucial barriers facing senior residents in urban areas (Buffel et al., 2013; Scharf et al., 2005).

Equally important is the growing digitisation of urban management (Baykurt & Raetzsch, 2020; Kandt & Batty, 2021), as cities prioritise online administrative procedures and services (Abella et al., 2017; Kitchin, 2016, 2019), and encourage citizens to use digital communication channels (de Luna & Kolotouchkina, 2020). Notwithstanding the continuous growth of social media in recent decades, as well as the increased ownership of smartphones and tablets by people over 65 (Casado-Muñoz et al., 2015; Faverio, 2022), coping with digitised cities and emerging digital lifestyles (Hatuka et al., 2021) is a frustrating experience for a significant number of older people (Friemel, 2016; Li & Alencar, 2022; Xiang et al., 2020). The exclusion of citizens over 65 from the placemaking dynamics of technological innovation and digital progress, primarily aimed at global elites and generations who are considered highly skilled digital natives (Kolotouchkina & Seisdedos, 2018; Najafi et al., 2022), is a critical issue for urban planners and policymakers.

The growing inequality in digital societies has been pointed out by Warf (2001, p. 6), who argues that “social categories of wealth, power, and place are inevitably reinscribed in cyberspace.” Similarly, Graham (2002, p. 37) emphasises that “urban societies become separated into the ‘on-line’ and the ‘off-line’ in complex tapestries of inclusion and exclusion,” thereby widening the social and technological divide. Furthermore, van Deursen et al. (2017) stress the importance of the intersectional assessment of digital and offline exclusion, as the internet magnifies existing offline inequalities.

While the important role of ICT in enhancing active ageing and the social engagement of older people has been acknowledged by scholars and practitioners alike (Llorente-Barroso et al., 2021, 2022), practices aimed at providing genuine digital inclusion of older people in digitised urban areas are scarce. Moreover, even though digital ageism is now receiving increased attention from researchers and policymakers (Choi et al., 2020; Fernández-Ardèvol & Grenier, 2022; Friemel, 2016; Najafi et al., 2022; World Health Organization, 2021), there has been limited research focusing on programmes aimed at digital training and mentoring among senior peers, which could become an effective springboard for their digital inclusion. As people over 75 are generally invisible in prominent research databases and statistics regarding the digital divide and digital literacy skills (Fernández-Ardèvol & Grenier, 2022), gaining new insights and evidence about this age group is of utmost importance for policymakers and researchers.

The purpose of this study is to shed light on the innovative approaches of local governments aimed at fostering the active engagement of older people in the digital realm. The local perspective as a context for digital participation and innovation is an especially relevant factor in this research, as the experience of ageing in place and place attachment of older people have a strong influence on their self-perception, self-esteem, and social engagement (Lewis & Buffel, 2020; Sun et al., 2020).

In the present study, we have posed two research questions. The first aims to explore the main factors underlying digital ageism in the urban environment. The second focuses on understanding how the digital inclusion of older people is being addressed by local governments, based on the programmes that are considered essential in tackling the digital divide and digital ageism in the local context.

We begin with a review of recent studies on the digital divide and digital ageism among the senior population and the emergence of an age-friendly model of urban governance. Next, research methods and materials are described. Afterwards, the findings of our research will be used to outline a series of innovative practices implemented by three Spanish cities aimed at fostering the digital inclusion and digital autonomy of their older residents. The article concludes by discussing the main pillars and remaining challenges of age-friendly digital urban governance.

2. The Digital Divide and Digital Ageism

The digital divide is defined as the gap that exists “between individuals advantaged by the Internet, and those individuals relatively disadvantaged by the Internet” (Rogers, 2001, p. 96). The conceptual evolution of the digital divide construct is underpinned by the impact of critical disparities in access and use of the internet, and by vulnerable groups of citizens who are unable to take advantage of its benefits due to their age, ethnicity, income, gender, education, ability, or place of residence (Kolotouchkina et al., 2022; Mihelj et al., 2019; Sylvia & Szydlik, 2005; van Deursen et al., 2017).

The initial gap between the “haves” and “have-nots” concerning internet access (Mervyn et al., 2014) was identified as the first level digital divide. As further attention was paid to the importance of digital skills and digital literacy (Hargittai et al., 2019; van Deursen & van Dijk, 2019), the concept of a second-level digital divide was developed. The different levels of digital skill needed for a person to fully engage in a digital experience were set forth by van Deursen et al. (2017). Such skills range from the basic ability to use the internet for navigating and searching for information, to more advanced social and creative skills linked to interactive experiences and communication, content development, and sharing in the online environment. Similarly, Chetty et al. (2017) identified a multidisciplinary framework of skills that underpin the digital literacy construct, ranging from basic information like literacy to computer, media, communication, and technological know-how that enable a set of technical, cognitive, and ethical outcomes for internet users. Moreover, understanding the specific benefits, as well as the offline effects of using ICT, in addition to their impact on the strength of digital capital and digital citizenship, are the prevailing topics of current research on the digital divide (Ragnedda, 2018; Ragnedda et al., 2020; Ribble, 2021; van Deursen et al., 2017).

Research on the digital inclusion of seniors has identified a series of negative factors that could predict a low level of engagement in the digital environment as well as deep-rooted digital vulnerabilities, invisibility, and discrimination (see Figure 1). For instance, while the negative influence of age on internet access and use has been reported in various studies (Ragnedda et al., 2020), Friemel (2016) found that each additional year beyond 65 decreases the likelihood of access by 8%. Furthermore, the complexity of internet use, the perception of personal security risk, the lack of digital literacy, technophobia, the feeling that online use is a waste of time, and the associated cost of access to technology are some of the critical factors related to a lack of interest in digital technology and distancing by older people (Friemel, 2016; Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023; McDonough, 2016; Viñarás-Abad et al., 2022).

At the same time, the increasing complexity of using digital devices, as well as the growing variety of applications with frequently overlapping services, have become additional barriers for older people and have hindered their digital inclusion (Hänninen et al., 2021). Research by Mihelj et al. (2019) on digital engagement with museums and art galleries shows that online access replicates existing inequalities in offline participation, widening the gap between the “haves” and “have-nots” for older people. Li and Alencar (2022) have documented how advanced digital infrastructures in one smart city in Hainan, China have increased the digital divide for seniors by preventing their access to banking and healthcare services. The authors report that the Covid-19 restrictions were especially challenging for seniors in China.

A disregard for the digital needs, abilities, and interests of older people fosters their digital invisibility

and gives clear evidence of a new type of digital social stigma and discrimination. The ageism phenomenon, originally conceived by Butler (1969, p. 243) as “a personal revulsion to and distaste for growing old, disease, disability, and fear of powerlessness, ‘uselessness,’ and death,” has evolved into a more complex construct currently defined by the World Health Organization (2021, p. 2) as “the stereotypes, prejudices, and discrimination directed toward others or oneself based on age.” With the exponential growth of the digital domain, ageism has clearly been revealed as a form of digital discrimination and exclusion of older people.

Choi et al. (2020) report the coexistence of two types of ageism. While self-directed ageism is experienced by older people who identify themselves as digitally incompetent and vulnerable based on the mere fact of being old, other-directed ageism reveals prevailing social discrimination based on a negative perception and representation of old age. In this regard, the presence of a higher level of self-directed ageism was found among women, which is a predictor of lower rates of internet use among this gender, while internet use by middle-aged men was negatively affected by other-directed ageism (Choi et al., 2020). Moreover, research by Rosales and Fernández-Ardèvol (2020, pp. 1074–1075) has identified a series of perilous ageist practices on digital platforms, which fail to consider specific age-related needs and health conditions, leading to discrimination of older users. Specifically, these authors raise concerns about the homophilic, or self-centred ideas of developers and design teams, which are usually composed of younger people influenced by their own views, interests, and practices. Another of their concerns is the prevalence of corporate ageist values behind the development of algorithms that tend to duplicate

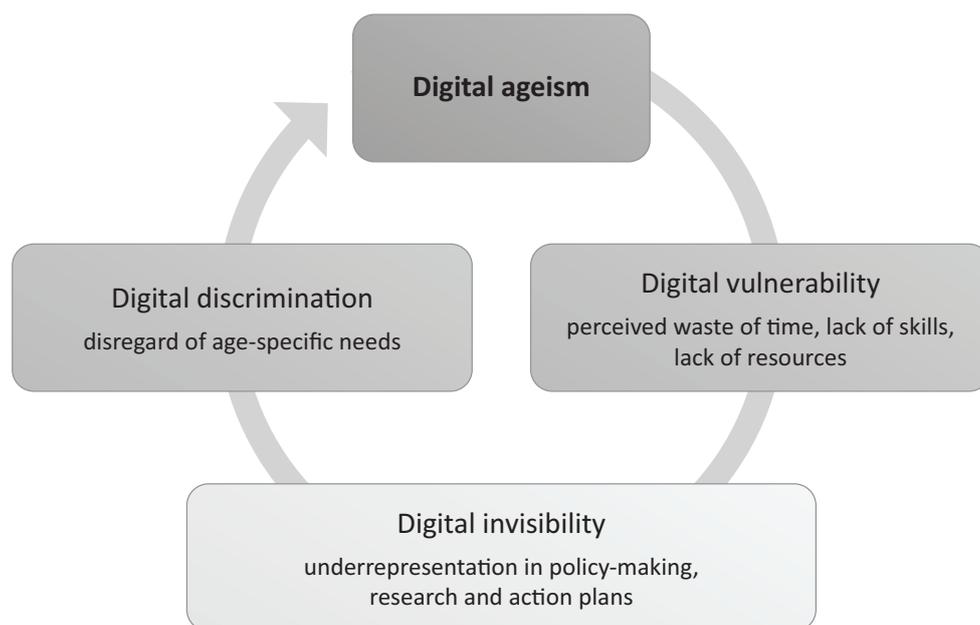


Figure 1. Digital ageism.

existing stereotypes within the content provided to their users. A review of the CAPTCHA security test highlights the neglect of physical, learning-focused, and cultural limitations that might be experienced by older people. Similarly, biometric security systems such as fingerprint or face recognition usually fail to consider physical limitations due to ageing or medical treatments (Rosales & Fernández-Ardèvol, 2020).

Older people are also underrepresented in research methods involving forecasts, analytics, and data gathering on digital platforms. While the prevailing assumption of the low importance of people over 75 for studies on digital access and use hinders their inclusion in research (Sourbati & Behrendt, 2021), in most studies, even the age of 65 was reported to be the age limit for inclusion in research samples (Viñarás-Abad et al., 2022). Fernández-Ardèvol and Grenier (2022) have pointed out the omission of people over 75 years of age from the most relevant EU datasets on digitisation.

On the other hand, among the factors that predict positive attitudes toward the internet and digital technology, thereby promoting the digital inclusion of older people, the personal and family network of seniors was found to be the most important (Friemel, 2016; Hänninen et al., 2021). In China, for example, research by Li and Alencar (2022) shows that adult children and grandchildren usually buy smartphones for senior family members, which enables their access to technology. Younger family members and peers are also more likely to help older people overcome increasing complexities and barriers to the digital world, providing support for buying, installing, and repairing devices, as well as downloading software and apps, managing security issues, and helping with the co-use of digital technology (Hänninen et al., 2021).

3. Age-Friendly Digital Cities

An increasing number of people in cities who are over the age of 65 need policymakers who can introduce efficient and sustainable adjustments, in order to overcome age-related barriers and to ensure the well-being of the ageing urban society. In 2010, the World Health Organization launched a Global Network for Age-friendly Cities and Communities intending to share, promote, and support the best practices of effective place management that focus on the ageing population. The network has over 1,440 cities and communities in 51 countries (World Health Organization, n.d.), which are committed to ensuring easy access to essential services for their older residents, such as healthcare, social services, public transport, and employment opportunities, as well as access to the physical environment, including affordable housing, outdoor spaces, etc., in addition to autonomous living and social engagement (OECD, 2015; World Health Organization, 2007). Among the key priorities in fostering age-friendly urban communities, Rémillard-Boilard et al. (2021) highlight the need to address ageism by chan-

ging the perceptions and attitudes of ageing to a more positive vision, encouraging engagement and collaboration with age-friendly initiatives from a wide range of partners, and taking into account the intergenerational diversity of older people as well.

Building age-friendly communities is an important yet difficult challenge for smart cities. Digital urban governance based on ICT platforms, the Internet of Things, as well as solutions involving the application of artificial intelligence for smart ambient systems and assisted-living environments, offers great potential for enhancing the quality of life of the ageing population and enabling them to carry out essential daily activities at home. Skouby et al. (2014) argue that social interaction, health and home care, personal safety, the provision of essential daily goods, and being able to complete household chores are the most important areas for which ICT can have an effective impact on the well-being, autonomous living, safety, and dignity of older people in smart cities. The use of portable devices, wearable smart clothes, home healthcare and accident sensors, emergency alarms, virtual personal assistants, home companion robots, as well as virtual rehabilitation and tele-care platforms are some of the latest personalised ICT solutions for addressing age-related conditions, while fostering independent living and reducing health-care costs (Skouby et al., 2014).

Moreover, the role of ICT in simplifying daily tasks and administrative procedures for older people (Viñarás-Abad et al., 2017), as well as the impact of ICT-mediated learning on reducing the unwanted loneliness and social isolation of seniors (Llorente-Barroso et al., 2021), are important factors to consider in digital urban environments. At the same time, the importance of actively engaging older people in the co-design of smart urban solutions in order to overcome ageist practices, and to foster agency as well, is being increasingly addressed by scholars (Ahmadpour et al., 2019; Borda & Pedell, 2021). Wolff et al. (2020) emphasise the impact of co-design and bottom-up approaches that consider citizens to be key stakeholders and active collaborators in the development of smart urban solutions and services.

Digital inclusion and accessibility are becoming increasingly important in smart city governance (Kolotouchkina et al., 2022). Micozzi and Yigitcanlar (2022) highlight the shifting focus of smart cities toward educating citizens in digital literacy, promoting their digital identity, and effectively integrating them into the decision-making process. Regular access to the internet, digital literacy, and social media skills are some of the critical factors that predict digital citizenship and full participation in society through online means (Mossberger et al., 2012). Therefore, digital and age-friendly urban governance can be defined as policymaking aimed at enabling active digital citizenship for older people, in order for their digital experience with the city and their local community to be accessible, inclusive, empowering, and positive.

In this regard, local governments still face many challenges in offering effective digital inclusion for their older residents. In addition to age-related conditions, such as limited hearing and sight, or memory loss, perceived learning difficulties and safety concerns are some of the main barriers hindering active engagement by seniors in the digital world. Furthermore, digital participation by this population in the public domain, as well as in decision-making, may be affected by a dual paradox: Since the elderly are generally excluded from the decision-making process due to their low level of technological skills, their own lack of self-confidence makes them even more reluctant and afraid to engage in active participation (Najafi et al., 2022).

While the experience of ageing in place and place attachment of older people have positive effects on their self-esteem, social engagement, and self-perception (Lewis & Buffel, 2020; Sun et al., 2020), identifying relevant initiatives of local governments aimed at the digital inclusion of senior residents is an important contribution to the development of cities that are age-friendly and digital.

4. Method

This exploratory and interpretive research is aimed at identifying emerging challenges and best practices of age-friendly and digital urban governance. In this article, we have used a case study and mixed qualitative methodology. The exploratory case study method is an empirical inquiry that focuses on the in-depth analysis of a contemporary phenomenon in a real-life context (Yin, 2009).

Spain is a country with one of the highest life expectancies in the world at more than 83 years, and nearly 20% of the population is 65 years old or older (Population Reference Bureau, n.d.; World Population Review, 2023). A total of 225 cities and towns in Spain are members of the Spanish Network of Age-Friendly Cities and Communities, whose aim is to foster active ageing and social engagement of its older people (IMSERSO, 2022). Furthermore, 93 Spanish cities with a population over 50,000, and 44 towns with a population under 50,000, are part of the Spanish Network of Smart Cities, which is committed to ICT-led urban innovation (RECI Smart Cities, n.d.). Spanish cities combine several important aspects in order to explore and assess how local governments pursue the digital inclusion and accessibility of seniors. For these reasons, three Spanish cities (Madrid, Toledo, and Bilbao) were included in our research sample in order to review and evaluate their experience as age-friendly cities committed to digital innovation.

Data was collected using a qualitative research methodology. The fieldwork was carried out from March to December 2022. Semi-structured interviews lasting an average of one hour were conducted online with public officials from the areas of digital accessibility, digital inclusion, and seniors, within the three city governments. Public officials were identified on the municipal web-

sites of the selected cities and contacted by email with a request for a personal online interview. The interviews were conducted and recorded in Spanish with the consent of the respondents. All interviews were then transcribed, checked for accuracy, and translated into English for analysis. Regarding research ethics, informed consent was given by the key interviewees (Miller & Boulton, 2007). Finally, a qualitative analysis was carried out in order to assess the key findings.

The personal interviews were conducted with the following people: the deputy director of seniors of the city of Madrid; the manager for citizen advice services, also of the city of Madrid; the director of seniors of the Castilla-La Mancha regional government; and the manager for quality and evaluation of the city of Bilbao. The main purpose of the interviews was to understand how the digital inclusion of older people is being addressed by local governments, as well as the areas considered crucial in tackling the digital divide and digital ageism in the local context. The interview included questions related to age-friendly policies implemented by each city, urban priorities in the field of digital inclusion and accessibility, the most noteworthy initiatives aimed at digital training of older people, and a review of the challenges that remain.

Furthermore, relevant data sources on innovative projects developed by the local governments were identified and analysed. The information on those sources was reported by informants, as well as gathered through desk research and academic literature.

For this study, we prioritised top-down projects envisioned and promoted by local governments, so that we could better understand the stance of policymakers in the context of age-friendly digital cities. Therefore, one of the limitations of our approach is that no older people were consulted for the data collection.

5. Age-Friendly Digital Urban Governance in Spain

5.1. Madrid

Madrid Action Plan 2021–2023, the goal of which is to become an age-friendly city, places special emphasis on the importance of bridging the digital divide and fostering the social inclusion of older people through better access to information and the use of ICT. The general directorate for seniors of the city of Madrid is pursuing a comprehensive policy of designing effective programmes, services, and tools aimed at promoting active ageing and supporting citizens over 65 years of age, in addition to fostering their social engagement (Madrid, n.d.).

Bridging the digital divide is the main purpose of a broad range of initiatives by the city of Madrid that focus on the promotion of digital literacy and the use of the internet as the foundation of autonomous and independent living, which include the following:

- Introduction of easy-to-use digital certificates for administrative procedures.
- Development of an app known as Madrid te acompaña (Madrid accompanies you) for Android and IOs in order to reduce the unwanted loneliness of older people.
- Creation of an online community for senior home care services users, as well as their families and caregivers.
- Improvement of advanced tele-care home services that emphasise the use of ICT for enhanced monitoring and emergency response.
- Pilot project for a telemedicine service aimed at assisting chronically ill seniors.
- Optimisation of the online platform known as Madrid te ayuda (Madrid helps you), which provides access to all relevant services and information for seniors.
- Guided online tours of museums in Madrid.

The city app known as Madrid te Acompaña has become an important tool for addressing the unwanted loneliness of older citizens. The purpose of the app is to connect citizen volunteers of the city of Madrid with older people who might need a person to accompany them in their daily chores, medical appointments, administrative formalities, or leisure activities. All citizen volunteers undergo specific training for accompanying older people. Of the 17,000 citizen volunteers in Madrid, over 400 have already finished their training (L. Adeva, interview, March 14, 2022).

A network of public libraries and 91 daycare centres for seniors in Madrid has also gained a prominent role within the age-friendly Madrid strategy as key promoters of ICT-mediated learning and access points for digital resources and tools. The 91 daycare centres have IT classrooms and facilities to teach digital literacy and internet skills. All courses are open to everyone and free of charge. As well as digital literacy training, the focus is on hands-on experience in gaining digital access and using tools that are increasingly necessary for online administrative procedures, such as digital IDs and digital certificates. Furthermore, in response to the growing complaints of older people about the closure of bank branches and the shift of banking transactions to the online world, courses in online banking and management of financial products have recently been introduced (L. Adeva, interview, March 14, 2022). The network of Citizen Service Offices of the city of Madrid is another important programme that enables seniors to participate in the digital realm, especially due to this office providing in-person and tailored advice and training for seniors in order to assist them in their digital administrative tasks (R. M. Rodríguez, interview, March 7, 2022).

The tele-care service in Madrid has over 115,000 users, while the home-care service has more than 30,000. Both services rely on digital tools to foster senior digital engagement and communication through

video calls, online group entertainment, and educational activities.

Taking a participatory approach, as well as bottom-up initiatives, are also emphasised in Madrid. The Board of Seniors is a forum for discussion and advice on all relevant issues related to older people. The Board represents all the main associations and institutions of seniors in Madrid. In fact, one of the workgroups most recently created by this Board is specifically aimed at addressing the digital divide of seniors (L. Adeva, interview, March 14, 2022).

5.2. Bilbao

The *Strategy for Universal Accessibility of Euskadi* sets out the governing principles for the effective access of all citizens to public services, information, and administrative procedures (ISEK, 2020). One of the main goals of this strategy is to bridge the digital divide of senior citizens, who represent 23% of the population. Universal access to public administration and public spaces is essential in order for seniors to enjoy active ageing and a good quality of life in the city (C. Martínez, interview, March 23, 2022). Furthermore, self-determination and autonomy, as well as engagement in the co-creation of policy-making and inclusive governance are among the fundamental principles of the *Basque Country Strategy for Seniors 2021–2024* (Del Barrio et al., 2023).

The main priorities of this initiative are the following:

- Free access to public wi-fi throughout the city, including in the main recreational facilities and the most popular public spaces, and in outlying neighbourhoods, which have the largest digital divide.
- Standardisation of e-government processes.
- Effective implementation of the Bilbao Smart City Strategy.

Both the design, as well as access to the digital content on the municipal online platform, comply with the Web Content Accessibility Guidelines 2.0, outlined by the World Wide Web Consortium (World Wide Web Consortium, n.d.). The digital platform known as Mayores de Bilbao (Bilbao seniors), launched by the city hall, offers information on local associations and work groups of older people in eight neighbourhoods of the city. It also provides information on leisure and entertainment activities, as well as relevant news about services and personal assistance in emergency situations (Mayores de Bilbao, n.d.).

The network of KZungea public training centres in Bilbao is the main facility for the implementation of digital literacy and digital accessibility courses for seniors. The courses range from the most basic digital skills to training in communication and management competence on social networks, as well as the use of apps and more advanced digital tools for self-employment, healthcare, personal security, leisure, and entertainment.

Courses are free of charge and available both in-person and online in order to enable universal access depending on the personal circumstances of each user.

The focus on active ageing has also become a reality through the most recent initiative, ALTXOR. The aim of this project is to create a new online service and pilot network of offices for information, training, and support for people over 65 who are interested in launching a new individual or shared start-up business or social initiative. Access and training in digital technology, as well as promoting technology for well-being and home care, are some of the key goals of ALTXOR (Del Barrio et al., 2023).

Mentoring service for basic and advanced skills in digital literacy is also offered to seniors through a platform that focuses on digital friendliness, launched by the regional government of Bilbao. The platform offers both in-person and online topic-based workshops on the use of smartphones, access to the internet, email, WhatsApp, using digital maps, online access to medical appointments, YouTube, and digital security, among other subjects (Amigabilidad Digital, n.d.).

Furthermore, the City of Bilbao is an active supporter of the SECOT Bizkaia (Seniors para la Cooperación Técnica) local association of retired business executives, which offers mentoring and training in entrepreneurship, business management, fundraising, and networking for local start-ups, small and medium enterprises, and NGOs (SECOT Bizkaia, n.d.). Active ageing is one of the key principles of SECOT. In addition to mentoring projects, the association has a social platform called Jubilación Activa (Active Ageing), which offers a wide range of activities for people over 60. The activities are grouped into three topic areas: time for you, time for your loved ones, and time for other people. Self-care, health, education, leisure, entertainment, social networking, hobbies, volunteering, and open talks with guest speakers are some of the high-profile activities for seniors. The YouTube channel of the platform features open discussions. One of the most recent workshops hosted by SECOT in partnership with a local bank addressed the topic of the digital divide among older people and offered practical sessions on the use of apps, digital healthcare, online banking, online security, and social networking (Jubilación Activa, n.d.).

5.3. Toledo

The principle of active ageing underpins key strategic initiatives and projects undertaken in the capital of the autonomous region of Castilla-La Mancha. Fostering digital literacy and promoting an inspirational digital experience for the independent and autonomous living of older people are the pillars of the local action plan. The network of local daycare centres for seniors and NGOs are the key players in the process of training, skills development, and social networking of older citizens in Toledo. Their role in enhancing the quality of life of people over 65 through promoting active and

independent living, as well as mitigating social exclusion and unwanted loneliness, is especially noteworthy (A. Rodríguez, interview, December 13, 2022).

Enabling digital literacy and fostering access to the internet and communication technology for seniors in Toledo is one of the main goals of the city. Los Mayores Forman la Red (Seniors comprise the web) is the title of the digital training initiative launched by daycare centres for seniors. Courses are taught both in-person and online and are free of charge. Topics include creating a Gmail account, making video calls with WhatsApp and Zoom, and information about essential resources for smartphones and electronic administration (Inciso, n.d.).

In a similar vein, since 2016 the regional government of Castilla-La Mancha has been conducting a training programme known as CapacitaTIC55, which specifically targets younger seniors who are 55 and over. Their main goals are bridging the digital divide and fostering inclusion through the promotion of digital literacy, the use of computers and smartphones, and digital networking and communication. Moreover, both the in-person and online courses are free of charge. In addition to training in the most basic digital skills, there are topic-based workshops related to digital ID, online banking, electronic administration, and advice on entrepreneurship and job counselling. Over 8,000 citizens have been trained since the launch of the programme (CapacitaTIC55, n.d.).

The use of digital platforms for social engagement and active participation of older citizens is another key initiative in Toledo. During the Covid-19 lockdown, daycare centres for seniors launched the Move at Home initiative for the purpose of engaging older people in activities involving sports and entertainment, such as yoga, fitness, reading clubs, English, music, dance, and arts and crafts through an extensive range of tutorials uploaded to the YouTube channel of each centre. Although in-person activities are preferred by this age group, the digital experience is becoming increasingly common.

In addition, tele-care is a free 24-hour service in Toledo for residents over the age of 70, aimed at providing personal assistance and emergency response through landline telephones, smartphones, and other digital devices. Social isolation, welfare checks, domestic accidents, and a lack of activity are monitored and addressed through the service. The push-button alarm attached to a necklace or wristband can be activated by users in any domestic emergency, or to request specific information or clarify any possible doubts.

6. Conclusions and Discussion

The ageing of urban populations poses serious challenges for policymakers and urban planners alike. While the number of people in cities over the age of 65 is increasing, the digital transition in urban areas is raising concerns about the persistent digital divide facing older citizens, as well as the digital inequality and ageism inherent to most digital experiences (Friemel, 2016; Li

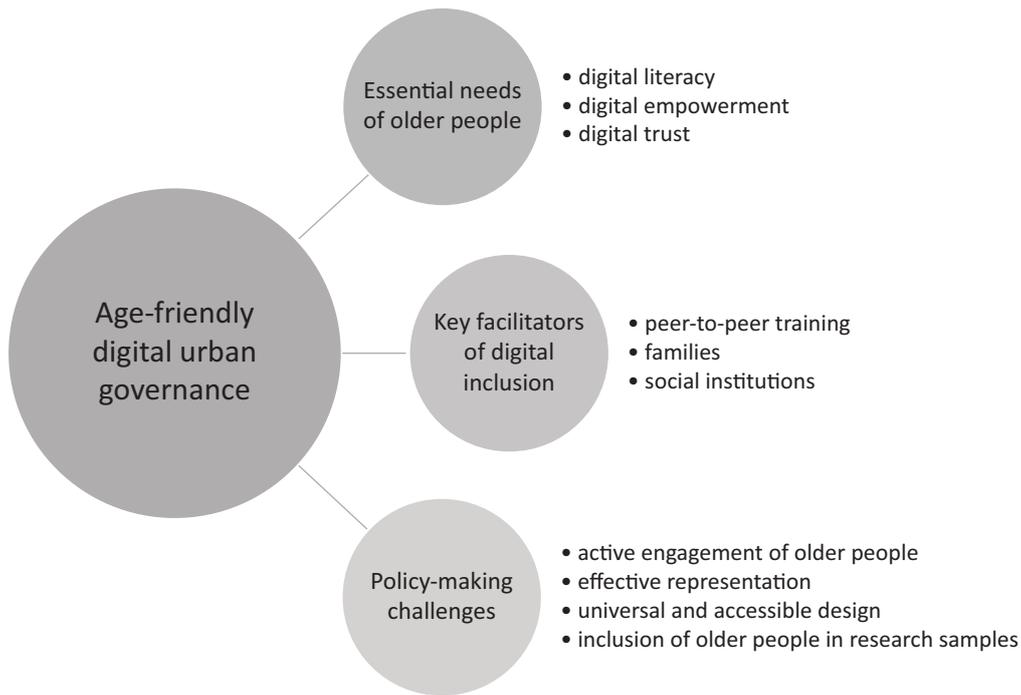


Figure 2. Age-friendly digital urban governance.

& Alencar, 2022; McDonough, 2016). Lack of access to the internet, low digital literacy, self-perceived incompetence, and the feeling that online use is a waste of time are factors that have led to digital vulnerability among older citizens. At the same time, the digital invisibility and exclusion of seniors are reinforced by the negative perception of old age, the omission of senior populations from research, and the disregard for specific age-related needs and health conditions that prevent full digital engagement (Choi et al., 2020; Rosales & Fernández-Ardèvol, 2020; Sourbati & Behrendt, 2021). Digital ageism is a new type of social exclusion of older people that is underpinned by their digital vulnerability, invisibility, and discrimination in the digital realm.

In the existing literature on the digital divide and digital ageism, local initiatives aimed at actively training seniors in digital skills and digital inclusion have received little attention. As the experience of ageing in place and place attachment have a positive impact on the personal well-being and self-perception of older people (Lewis & Buffel, 2020; Sun et al., 2020), the identification of innovative practices and initiatives implemented by age-friendly digital cities provides insight into the scope of effective tools and facilitators that promote the digital inclusion of seniors.

A review of the experience of three age-friendly cities in Spain, which have focused on digital innovation in urban governance, shows a commitment by public administration toward fostering digital literacy, creating a positive digital experience that is universal, and engendering trust in the internet by older citizens. This is in line with previous research on the priority of smart cities to enhance digital citizenship and foster active engage-

ment in the online society (Micozzi & Yigitcanlar, 2022; Mossberger et al., 2012). In terms of the format of local initiatives, in-person and online training courses that are free of charge and aimed at helping seniors develop practical digital skills were found to be the most popular in all three cities. The combination of training to carry out useful administrative tasks, access to cultural and entertainment activities, and the focus on an active lifestyle and social networking skills were identified as the key strengths of the initiatives reviewed.

Furthermore, the network of daycare centres for seniors, public libraries, and non-profit organisations led by older people was reported to be the main facilitators of digital empowerment, as well as knowledge spillover at the local level. Being physically close to such places, as well as the overall age-friendly approach of these institutions and facilities has played a major role in making them key players in the digital transition at the local level. This finding is consistent with research carried out by Hänninen et al. (2021) on the essential role of warm experts as mediators and enablers of a positive digital experience for older people.

Our analysis suggests that building digitally-inclusive and age-friendly cities requires a consistent commitment in order to ensure the digital inclusion and digital rights of older people in urban areas. A thorough understanding of the digital needs of older people, in addition to the barriers and discrimination they face in the digital realm, is the key to developing a comprehensive digital inclusion strategy. Moreover, to overcome barriers rooted in ageist practices in the digital world, a coordinated multi-stakeholder approach has proven effective in all the cities analysed (see Figure 2).

Finally, a sustained commitment by policymakers to raising awareness of the widening digital divide and discriminatory ageism is essential for ensuring that older citizens are not left behind in the new digital urban age. The true representation of older people in local governments through discussion and advisory councils, the promotion of co-creation and participatory initiatives led by older people, and the standardisation of universal design and accessibility, are some of the key contributions made by the Spanish cities in their transition to becoming places that are digitally inclusive and age-friendly.

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Conflict of Interests

The author declares no conflict of interests.

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Article

Digitalised Welfare: Access, Usage, and Outcomes Among Older Adults

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Abstract

The slogan “digital first” has become a buzzword for public organisational development at the local, regional, and national levels in Sweden. The slogan alludes to the idea that providing information to and communication with citizens should take place primarily through digital channels. This idea is also popular in other parts of the digitalised world. Obviously, digital solutions have the potential to become pedagogical, reliable, and effective interfaces for governmental interaction with citizens. However, the extent to which they are actually accessible, brought to use, and valued among older adult users (more than 65 years of age) has not attracted much research interest. Drawing on national survey data, collected in November–December 2020, on Swedish citizens (aged 65 to 90 years), this article will start to compensate for this deficit. First, it analyses the extent to which citizens have physical access to required devices and how access is related to material, discursive, and social resources. Second, it analyses resources and usage of important platforms for public services for older adults: the Pensions Agency, health care, e-pharmacy, the Social Insurance Agency, and the Tax Agency. Finally, the article examines outcomes: feelings and attitudes towards experiences of encountering a digitalising society. The article demonstrates how all three levels of divides—access, usage, and outcomes—are clearly related to older adults’ access to material, discursive, and social resources, as well as to age and pre-retirement experience with computers. It is comparatively younger individuals with longer formal education and at least average incomes and social networks who benefit the most from digitalised public services.

Keywords

Digital First; digital inclusion; digitalisation; digitalised public services; older adults; Sweden

Issue

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1. Introduction

In a public letter to the then-Swedish-minister-of-digitalisation, Member of Parliament Thomas Hammarberg expresses worry (Hammarberg, 2021). Hammarberg refers to the rapid rate of digitalisation in Sweden and how this threatens to exclude “many people in the older generation” (Hammarberg, 2021, translation by the authors). Hammarberg refers to how digitalisation, among other things, has created difficulties for older adults “to get in touch with authorities and with institutions responsible for care and other

social services” (Hammarberg, 2021, translation by the authors). He also calls for the importance of analysing “what should be done to bridge the problems for the elderly that digitalisation has in fact created” (Hammarberg, 2021, translation by the authors).

The concerns expressed in Thomas Hammarberg’s letter to the minister point towards important facets of digitalisation. First, his letter identifies how the digitalisation of information and services is developing rapidly, and how this is happening in a way that threatens to exclude many people. Second, it signals the need to pay specific attention to older adults, as they are at risk of

lagging behind in the digital transformation of commercial and public services. Finally, the letter points to the need for analyses of how to overcome the problems digitalisation causes for older adults.

There are good reasons for a member of the Swedish parliament, who cares specifically for older adults, to be worried. In 2015, a national programme was launched with the overarching aim of digitalising health, social, and other welfare services. The programme is called “Digital First” and its explicit ambition is to make digital services the “default choice in public sector contacts with individuals and organizations” (Digg, 2022). The strategy has good intentions. It was formulated with the ambition to make administration and governance more effective, transparent, and accessible. While these are obviously legitimate ambitions, the strategy also reveals very little insight into one of the profound consequences of the digitalisation of public services: how applying digital technology to deliver such information and services *also* means providing citizens with very different conditions within which to stay informed and protect their social rights.

Admittedly, Swedes’ access to digital media, in general, is comparatively extensive; after Finland, Denmark, and the Netherlands, Sweden ranks as the fourth most digitalised country within the European Union (European Commission, 2022): 98% of the Swedes have access to a smartphone, 88% to a laptop, and 69% to a tablet. However, the distribution among the 65- to 85-year-olds is significantly lower; in this age range, 88% have access to a smartphone, 76% to a laptop, and 63% to a tablet. Older citizens are instead overrepresented as subscribers and readers of daily newspapers, and they prefer public service to other broadcast media (Ohlsson, 2022). With that being said, the 65- to 85-year-olds are not a homogenous group: 20% can be classified as silver surfers who have, more or less, the same usage patterns as younger generations (Olsson & Viscovi, 2020), while an equal number, 20%, are non-users (Olsson & Viscovi, 2022), and between these extremes there are of course further variations.

Thus, Digital First makes Swedish citizens dependent on digital devices in order to receive information from and interact with welfare services. As such, the policy overlooks a number of well-known problems related to important differences between citizens when it comes to the ability to access and use digital services. Such differences are linked to citizens’ varying access to economic and educational resources as well as to the character of their social networks (Olsson et al., 2019a; van Dijk, 2020). Age is a well-known key factor. With higher age, the probability of having fewer digital devices increases, and the same is true for the probability of having a more limited repertoire of usage (Friemel, 2016). Having said that, it is also important to point to the fact that older adults by no means are a singular category of users of digital media. Extant research has illustrated variations among older adults regarding both how they make use

of digital media (Llorente-Barroso et al., 2023) and online services (Sánchez-Valle et al., 2022).

Sweden’s Digital First, however, is by no means the only strategy of its kind. Similar ideas have flourished in many Western democracies during the early decades of the millennium. The European Commission makes an annual ranking of European countries which measures their degree of digitalisation of public services. In 2021, Finland was ranked number one in the Digital Economy and Society Index 2022, with Netherlands, Ireland and— notably—Denmark, and Sweden holding the other top positions (European Commission, 2022). The Danish case is interesting in this regard, as Denmark has come a particularly long way in establishing the idea of making public services digital by default (Schou & Pors, 2019).

These European initiatives share the ambition to make public services more efficient, transparent, and available. While doing that, they also share a blind spot with Sweden’s Digital First, that digitalisation of information and services also means the exclusion of some citizens from information and services. Older adults are specifically vulnerable in this regard, and the aim of this article is to contribute survey data on how Swedish older adults are positioned in the ongoing digitalisation of information and services. In order to offer such insights, the article centres around three distinct but interrelated research questions:

- RQ1: How does physical access to digital media vary between different categories of older individuals?
- RQ2: How does the usage of public service online platforms vary between different categories of older individuals?
- RQ3: How do outcomes in terms of feelings and attitudes towards being an internet user vary between different categories of older individuals?

2. Theoretical Framework

The research questions and the forthcoming analysis are informed by and contribute to two ongoing discussions within contemporary research on the societal consequences of digitalisation. First, the article relates to three decades of development in research on digital divides, but with a specific emphasis on divides among older adults. Second, it draws on and offers an empirical contribution to recent critical theorisation of digitalisation in public service contexts. More specifically, the article contributes by providing insights regarding the reconfiguration of the relation between welfare services and older adult citizens.

2.1. Three Levels (and Generations) of Digital Divides

In the early 1990s, media research had already started to pay close attention to digital divides (cf. Murdock et al., 1992). Since then, divides have been an important area

of research, with contributions from a range of other academic disciplines, such as political science and sociology. Despite major social and technological changes over three decades, divides still exist, and older adults are certainly not exempt. Morris and Brading (2007) even coined the expression “the grey divide” while identifying how older age groups are much slower to adopt technology than younger groups.

In an effort to both summarise extant research on digital divides and to point towards a future research agenda, van Dijk (2020) outlines a history of research on digital divides. van Dijk outlines three phases of research, focusing on different facets of divides. The first phase (1995–2003) of research focused mainly on the first level of divides, which means studies of *physical access* to computers and the internet (van Dijk, 2020, p. 7). The second phase added new layers to research on digital divides by also paying attention to users’ *skills and usage patterns*, a second level of divides (2004–present; van Dijk, 2020, p. 9). Starting around 2012, additional layers were brought into research on digital divides. With this third level of divides, users’ *outcomes and benefits* of usage have become prioritised areas in analyses of digital divides (van Dijk, 2020, p. 12).

For contemporary older adult users, all three levels remain relevant to include in analyses of digital divides. Thirty years after the breakthrough of digital media technology, the impression of a technology that is unequally distributed remains. Among older adults, physical access to technology is still to a large extent determined by people’s access to material, discursive, and social resources (Olsson et al., 2019a). Among older adults, people with access to economic and educational resources have a higher degree of digital access and, on average, also more media devices (Friemel, 2016; König et al., 2018). In addition, there is an evident negative relationship between age and physical access. On average, Sweden’s 65- to 69-year-olds have everyday access to 3.25 devices, whereas the oldest age category, the 85- to 90-year-olds, has access to 1.08 devices (Olsson & Viscovi, 2022).

On the second level, the focus is on individuals’ varying skills and capacity to handle digital technology, as well as the ways in which they put it to use. The variations turn out to be large among older adults. On the one hand, there are so-called silver surfers: older individuals whose digital media practices and skills resemble those of younger users and who use their devices frequently and in knowledgeable and versatile ways (Olsson & Viscovi, 2020). On the other hand, there are users who rarely use their digital media (Olsson & Viscovi, 2022), often with a single device (usually a smartphone) and only to execute rather simple tasks a few times a week. Also in this regard, both age and resources are important factors (Olsson et al., 2019b).

The third level, exchange and valuation, pays attention to how much people appreciate using digital services: what they feel that they gain from them and if

they feel secure and satisfied when using them (see also Van Deursen & Helsper, 2018). In this vein, Fristedt et al. (2021) have studied different generations’ evaluations of and attitudes towards digital media. Their analysis reveals how negative experiences and evaluations are much more common among older adult users than among younger ones. Fristedt et al. (2021) emphasise that even if older adult users can be statistically classified as included, this does not necessarily mean that they also are satisfied users. Stevic et al. (2021) discuss older adults’ experience with smartphones and show how the frequency of active usage correlates positively with well-being. Other recent studies have pointed towards connections between elderly users’ frequency of use and perceived quality of life (Viklund et al., 2022).

This article adds to the growing field of analyses of digital divides among older adults in two different ways. First, it offers an empirical contribution based on a recent national survey (2020) that attends to all three levels of divides. As such, the article offers a nuanced account of how different levels of divides influence older adult users’ opportunities to navigate in everyday life when information and services in general and public services in particular are increasingly offered digitally by default. Second, the article analyses outcomes, the most recent addition to analyses of digital divides. More concretely, this means analysing not only older adult users’ access to digital technology and their patterns of usage but also how they perceive and feel about their interaction with digital services.

2.2. Reconfiguring Citizenship

At the time when the internet made its big breakthrough in the Western world, in the mid-1990s, its potential significance as a carrier of public information and services had already become a subject of both scholarly and policy attention. For instance, the Swedish governmental bill on measures to broaden and develop the use of information technology, from March 1996, stated how ICTs “should be used to develop contacts and interaction between the general public, companies, and public administration. Citizens’...contacts with the public administration shall be made simpler and more open” (Swedish Government, 1995, p. 67, translation by the authors). Important shares of this initial and searching discussion on how to understand new, digital forms of interaction between governmental agencies and citizens found its more stable conceptual ground with the introduction of the notion of *e-government*.

E-government refers to “the strategic, co-ordinated use of information and communication technologies...in public administration and political decision-making” (Von Haldenwang, 2004, p. 417), and research has covered a lot of this ground during the last couple of decades. Research has studied e-government with policy development from a theoretical angle. These studies have often centred on differences between countries,

examining how variations in national approaches to e-government vary with reference to other policy reforms (Joseph & Avdic, 2016) and with political ideology (Schou & Hjelholt, 2018). Another common theme in research has been analyses of how e-government shapes and reshapes working life for professionals within welfare sectors (Baudin et al., 2020). Another research thread has paid attention to the actual design of e-government information and services, what their interfaces look like, and the extent to which they manage to attract users' attention and engagement (Sachau & Hutchinson, 2012). In some of these studies, the citizens' perceptions and preferences have also been included in the analyses (Ebbers et al., 2016; Verdegem & Verleye, 2009).

Research on e-government has so far brought a lot less attention to the fact that the digitalisation of public information and services also means a reconfiguration of what it means to be a citizen. It is a recent addition to the menu of research on the digitalisation of public services to ask critical questions about what it actually means for citizens—and citizenship—that public services become digitalised in ways that make “citizens responsible for provisioning welfare services themselves” (Schou & Pors, 2019, p. 465). In this emerging body of research, Denmark has been a particularly frequent example, not least because the Danish government has been especially anxious to digitalise public information and services. Research on the Danish case has been fruitful. It has offered analyses of patterns of digital exclusion as they appear at citizen service centres (Schou & Pors, 2019). It has offered critical reflections on the discourse on citizenship within Danish governmental digitalisation strategies (Schou & Hjelholt, 2018). It has also offered contributions based on ethnographic insights into how digitalisation reorganises frontline workers' bureaucratic practices and changes their professional identity (Pors & Schou, 2021).

To this growing body of critical studies, this article contributes empirical insights from the user side. In this vein, our survey data on older adults' access to, usage of, and experiences interacting with digital information and services offer insights into how older adults, as citizen users, respond to the opportunities to access digital information and services.

2.3. Analytical Model

In order to contribute insights regarding the reconfiguration of the relation between welfare services and older adult citizens, we depart from an analytical model that we have developed and applied within the scope of our previous research on older adults' digital practices and experiences. The analytical model is inspired by domestication research (cf. Morley & Silverstone, 1990; Olsson et al., 2019a) and pays specific interest to how older adults appropriate digital media with reference to their varying access to *material*, *discursive*, and *social resources*. Paying attention to the fact that older adults'

varying access to such resources matters for the ways in which they appropriate digital media also underscores how older adults are by no means a homogenous category of users (cf. Stone et al., 2017). Our specific way of operationalising the resources in this article will be presented in detail in Section 3. On a more general and brief note, material resources usually refer to economic resources, while discursive resources refer to intellectual resources, such as level of education and computer experience from working life. Social resources refer to older adults' social networks, for instance, their everyday social life with family, friends, and other contexts of sociability.

3. Material and Methods

In November–December 2020, a postal survey was sent to a simple random sample of 2,500 Swedish citizens, aged 65–90 years. The sample was drawn from the SPAR register, provided by the Swedish Tax Authority, where all residents officially living in Sweden are listed. Altogether, 1,610 questionnaires were completed and returned, i.e., a gross response rate of 64.4%. Respondents were given the option to fill in the questionnaire either on paper ($n = 1,462$) or online ($n = 148$).

The representativeness of the sample is acceptable. According to registry data from Statistics Sweden, the proportion of men and women aged 65–90 is 47.4 and 52.6%, respectively; in the sample, the proportion is 49.2 and 50.8%. When grouping the sample into five-year intervals, the deviation compared to Statistics Sweden is less than 1% in most cases, with the exceptions of 70–74 years (deviation = 3.5%) and 80–84 years (2.2%).

Education levels are not completely comparable with registry data, as Statistics Sweden classifies education in a slightly different way than the present survey. Furthermore, Statistics Sweden occasionally has incomplete data on individuals educated abroad, which also aggravates comparisons. Nevertheless, in the age group 65–90 years, and according to registry data, 27.9% are classified as compulsory medium, 20% as vocational, folk high-school, and 52.1% as upper secondary and higher. In the sample, the approximate corresponding proportions are 25.1%, 29.6%, and 45.3%.

All in all, randomisation cannot guarantee perfect representativeness; however, we believe our data are of sufficient quality to provide reasonable answers to our research questions.

In the analysis below, age, gender, education, income, marital status, association membership, place of residence, and pre-retirement experience with computers are used as independent variables. Education and computer experience serve as indicators of discursive resources, in the same way, marital status and membership are indicators of social resources, and, finally, income is a measure of material resources.

The item on education consists of 10 answer options that have been reduced to three levels: *short* (a maximum of nine years of primary school or equivalent),

middle (vocational training or upper secondary school), and *long* (matriculation degree or university). Income is self-reported and includes all pre-tax household income (pension, allowances, capital gains, etc.). Pre-retirement experience with computers is based on the question: Did you use computers or digital media in the last five years of your working life? The answer options vary from *to a very high degree* to *not at all*; the latter has been coded 0 in the dummy variable.

Dependent variables, such as physical access to devices (see Table 1) derive from two items. In the first item, respondents answer “yes” or “no” to the question of whether they are using a laptop, PC, tablet, e-book reader, smart TV, or any other mobile device with internet access. In the second, respondents answer “yes” or “no” to the question of whether they are using a smartphone of any kind. The items have been computed, and a dummy variable has been constructed for logistic regression analysis, where 0 means *no physical access* and 1 means *access to one or several devices*.

Usage of public service online services, analysed in Table 2, derives from five items where respondents have reported how often they use five different platforms: the Swedish Pensions Agency, the Social Insurance Agency, the Tax Agency, 1177.se (public health care), and finally, an item on e-pharmacy. The items have been computed and transformed into an index (Cronbach’s alpha reliability analysis = 0.755), for linear regression analysis, varying from 0 to 100, where 0 means *no usage at all* and 100 means *maximum usage*.

Outcomes in terms of attitudes and feelings as users of digital media, displayed in Table 3, are similarly based on an index (Cronbach’s alpha = 0.806), for linear regression analysis, consisting of six items with 5-point Likert scales:

1. In broad terms, digital media are a positive thing for me.
2. Digital development in Sweden is too fast for ordinary people.
3. It feels embarrassing not to know how to use digital technology.
4. Sometimes I feel stressed by being required to use digital technology.
5. I like to try new technical gadgets.
6. I am afraid to make mistakes when I am using internet banking.

The index varies from 0 to 100, where 0 means *a thoroughly negative position*, and 100 means *a thoroughly positive position*.

4. Results and Analysis

4.1. Access

The first-level divide dealt with physical access to computers and the internet and lasted, according to van Dijk

(2020), from 1995 to 2003. However, the subject is still highly relevant if we consider older generations. In our sample, 9.9% ($n = 159$) report that they lack access to devices for internet usage, that is, the fundamental tools for gaining public online services. Let us now have a look at what factors explain inclusion and exclusion in this regard.

In Table 1 and Model 1, it can first be noted that there is no significant difference between women and men. The finding may seem trivial, but it is worth keeping in mind that through the history of home computing and digital media in Sweden, as elsewhere, men have always had greater access than women (Nordicom, 2000). Apparently, over time, the highly gendered access to media technology has become more equal, at least in terms of physical access.

Table 1 also reveals that age correlates negatively with access, a hardly unexpected result (Olsson et al., 2019a). The *OR* value of 0.826 means that with every added year, the odds ratio of having access decrease by 17.4% ($1 - 0.826$), or, put another way, with every six-year interval of increasing age, the odds ratio of not having access doubles.

Discursive resources measured as formal education reveals that one level above elementary school (*OR* = 2.366), more than doubles the odds ratio for access, which also applies to the next level of education (*OR* = 2.412). Furthermore, material resources (i.e., income) also have an impact, but not in the same cumulative way as education. Income over 300,000 SEK more than doubles (*OR* = 2.874) the odds ratio for access, while additional income over 600,000 SEK renders no significant increase. Social resources—operationalized as association membership (*OR* = 1.786)—also affect physical access positively, unlike marital status, and place of residence.

Overall, our data are to a considerable extent in line with extant research, referenced above: It is comparatively younger individuals, with longer formal education and at least average incomes and social networks, who are most likely to have access to online services. Thus, disconnected and disadvantaged in this matter are the oldest individuals with comparatively limited discursive, material, and social resources.

However, as Friemel (2016), among others, has found, pre-retirement experience with computers has a strong impact that might even out differences between groups. Work experience with computers, as a discursive resource, is therefore included in Model 2, and its impact is considerable. Individuals with computer experience have a sixfold higher odds ratio (*OR* = 6.070) compared to individuals without.

Still, some effects from Model 1 remain, albeit to a slightly lower degree. The effect of age has changed only marginally, from 17.4 to 15.8% (*OR* = 0.842), and income over 300,000 is still important. Individuals with the lowest incomes, below 300,000, are twice as likely as others (*OR* = 2.584) to lack devices for internet usage.

Table 1. Logistic regression: Physical access.

	Model 1				Model 2			
	β	S.E.	OR	Sign	β	S.E.	OR	Sign
Gender								
(Female)	—	—	—	—	—	—	—	—
Male	-0.377	0.214	0.686		-0.311	0.28	0.733	
Age	-0.192	0.018	0.826	***	-0.172	0.02	0.842	***
Education								
(Short)	—	—	—	—	—	—	—	—
Middle	0.861	0.222	2.366	***	0.570	0.24	1.768	*
Long	0.880	0.299	2.412	**	0.691	0.31	1.995	*
Income								
(-300,000)	—	—	—	—	—	—	—	—
301,000–600,000	1.056	0.247	2.874	***	0.949	0.27	2.584	***
601,000	1.232	0.745	3.428		0.946	0.76	2.575	
Marital status								
(Single)	—	—	—	—	—	—	—	—
Couple	0.403	0.238	1.479		0.359	0.25	1.432	
Association membership								
(Non-member)	—	—	—	—	—	—	—	—
Member	0.580	0.206	1.786	**	0.312	0.22	1.367	
Residence								
(Rural area)	—	—	—	—	—	—	—	—
Urban area	0.338	0.287	1.402		0.177	0.31	1.194	
Computer use in working life								
(No work experience)	—	—	—	—	—	—	—	—
Work experience	—	—	—	—	1.803	0.23	6.070	***
Constant	14.407	1.383	—	***	12.568	1.47	—	—
Nagelkerke's R^2	0.45	—	—	—	0.52	—	—	—
Correct classification	89.1	—	—	—	89.5	—	—	—

Notes: Individuals without access have reported a lack of PC, laptop, smartphone, tablet, e-book reader, smart TV, or any other device that enables internet usage; OR stands for "odds ratio"; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 1 points out two things. First, resources and age matter, just as Schou and Pors (2019) have suggested. Individuals with fewer resources, and who are therefore more often in need of welfare services, are the ones most likely to be disconnected. Second, work experience has a strong impact: individuals who have acquired digital skills have a significantly lower risk of being excluded from online services. "Citizens are divided into new groups," Schou and Pors (2019, p. 474) argue, "depending on their ability to use digital platforms." These assumptions are supported by our survey data on access to digital devices.

4.2. Usage

Let us look at individuals who actually have physical access, even though access as such does not guarantee internet usage. As mentioned above, 9.9% ($n = 159$) report a lack of access. However, 15.4% ($n = 243$) report that they never use the internet. Apparently, 5.5% with proper devices do not put them to use and hence are not using *online public services*. The linear regression analy-

sis in Table 2 displays the degree to which five different online platforms for public service are used.

Table 2, Model 1, reveals that gender remains insignificant; there is no difference between men and women when it comes to their frequency of usage of the online services in question. Again, age is an important factor; it is in fact the most important in terms of effect ($\beta = -0.244$). Education—middle ($\beta = 0.103$) and long ($\beta = 0.080$)—and income over 300,000 SEK ($\beta = 0.093$), as well as association membership ($\beta = 0.097$), all affect usage, while marital status—single or couple—does not. Individuals in urban areas use the services slightly more than people in rural areas ($\beta = 0.082$).

Model 2, with work experience included, has once again the largest effect ($\beta = 0.277$). Nonetheless, the impact of age ($\beta = -0.196$), education ($\beta = 0.065$ and $\beta = 0.067$), association membership ($\beta = 0.069$), and place of residence ($\beta = 0.078$) remain. Thus, even when we analyse individuals with physical access to devices for online activities, variation in usage of public online services is a fact. And again, it is the relatively younger

Table 2. Linear regression: Usage of public service online platforms.

	Model 1				Model 2			
	B	S.E.	β	Sign	B	S.E.	β	Sign
Gender								
(Female)	—	—	—	—	—	—	—	—
Male	-0.322	0.825	-0.012		-0.082	0.806	-0.003	
Age	-0.583	0.072	-0.244	***	-0.469	0.072	-0.196	***
Education								
(Short)	—	—	—	—	—	—	—	—
Middle	3.475	1.102	0.103	**	2.191	1.091	0.065	*
Long	2.192	0.911	0.080	*	1.843	0.890	0.067	*
Income								
(–300,000)	—	—	—	—	—	—	—	—
301,000–600,000	2.636	1.057	0.093	*	1.743	1.039	0.062	
601,000–	0.625	1.093	0.019		-0.097	1.071	-0.003	
Marital status								
(Single)	—	—	—	—	—	—	—	—
Couple	-1.246	1.109	-0.040		-1.034	1.082	-0.033	
Association membership								
(Non-member)	—	—	—	—	—	—	—	—
Member	2.699	0.849	0.097	**	1.914	0.836	0.069	*
Residence								
(Rural area)	—	—	—	—	—	—	—	—
Urban area	3.227	1.185	0.082	**	3.068	1.156	0.078	**
Computer use: working life								
(No work experience)	—	—	—	—	—	—	—	—
Work experience	—	—	—	—	7.456	1.036	0.227	***
Constant	51.263	5.513	—	***	39.320	5.630	—	***
Adjusted R^2	0.119	—	—	—	0.161	—	—	—

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; the index varies from 0 to 100 and measures the usage frequency of five online platforms for public service.

and resourceful individuals—with computer experience, longer formal education, and stronger social networks, who live in urban areas—who tend to use public online services the most.

4.3. Outcomes

This next measure, presented in Table 3, is not directly connected to public online services but is a more general measure of outcomes in terms of feelings and attitudes towards different aspects of being an internet user in a digitalising society, a society where more and more services are offered online only.

Table 3, Model 1, reveals that there is a difference between men and women, with men reporting a higher degree of satisfaction than women ($\beta = 0.120$). It is not within the scope of the overall aim of this article to delve deeper into this discrepancy between men and women, but the varying and gendered level of satisfaction with online experiences is certainly a potential topic for future research endeavours. Age continues to have a negative impact; the older an individual gets, the more modest

the outcomes tend to be ($\beta = -0.163$). Formal education ($\beta = 0.093$ and $\beta = 0.113$) and income over 300,000 SEK ($\beta = 0.125$) are also conducive to a higher degree of satisfaction, as is being an association member ($\beta = 0.108$).

In Model 2, where work experience is included and has a strong impact ($\beta = 0.247$), the impact of gender becomes even stronger ($\beta = 0.132$) compared to Model 1, while the impact of age is slightly more modest ($\beta = -0.124p$). Longer education is still a significant factor ($\beta = 0.102$) as is income over 300,000 SEK ($\beta = 0.097$) and being an association member ($\beta = 0.076$).

Overall, the outcomes vary, and to a large extent, the divides follow the patterns revealed by previous levels of divides. The patterns of digital inclusion and exclusion are persistent whether we focus on access to technology, usage of online public services, or general feelings and attitudes towards using them.

5. Discussion

This article has centred around three research questions. RQ1 and the analyses deriving from that help reveal

Table 3. Linear regression: Attitudes and feelings.

	Model 1				Model 2			
	B	S.E.	β	Sign	B	S.E.	β	Sign
Gender								
(Female)	—	—	—	—	—	—	—	—
Male	4.470	1.132	0.120	***	5.216	1.195	0.132	***
Age	-0.598	0.112	-0.163	***	-0.455	0.110	-0.124	***
Education								
(Short)	—	—	—	—	—	—	—	—
Middle	4.646	1.637	0.093	**	2.711	1.604	0.054	
Long	4.577	1.356	0.113	***	4.110	1.315	0.102	**
Income								
(-300,000)	—	—	—	—	—	—	—	—
301,000–600,000	5.315	1.566	0.125	***	4.126	1.525	0.097	**
601,000–	3.698	1.604	0.077	*	2.694	1.559	0.056	
Marital status								
(Single)	—	—	—	—	—	—	—	—
Couple	-0.725	1.661	-0.016		-0.553	1.609	-0.012	
Association membership								
(Non-member)	—	—	—	—	—	—	—	—
Member	4.463	1.270	0.108	***	3.142	1.242	0.076	*
Residence								
(Rural area)	—	—	—	—	—	—	—	—
Urban area	1.751	1.776	0.030		1.706	1.721	0.029	
Computer use in working life								
(No work experience)	—	—	—	—	—	—	—	—
Work experience	—	—	—		12.575	1.574	0.247	***
Constant	82.510	8.405	—	***	65.118	8.430	—	***
Adjusted R^2	0.137	—	—	—	0.190	—	—	—

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; the index varies from 0 to 100 and measures feelings and attitudes towards different aspects of being an internet user.

how the degree of digital exclusion increases with age, and how both levels of discursive and material resources correlate positively with access to devices. Also, social resources matter, as older adults with larger networks generally have access to more devices than those with fewer social ties. RQ2 reveals very similar patterns. When focusing on the actual usage of online public services, the frequency decreases with age, which essentially means that online availability of public services does not necessarily make them more accessible to ageing adults. Also in this regard, material as well as levels of discursive and social resources have an influence. Older adults with higher incomes, higher levels of education, and stronger social networks are more likely to use public online services. Computer experience during working life is also important. It increases the probability of usage of online public services. Analyses deriving from RQ3 point towards very similar patterns of digital inclusion and exclusion. Also, feeling at home and satisfied with online services in general follows the same patterns as previous levels of divides.

Referring back to the theoretical framework, our data and analyses reveal how the different levels of digital divides are intimately related to one another. The degrees of access and usage and the outcomes from interaction with digital media covariate in a way that cements patterns of digital inclusion and exclusion among older adults.

These variations between groups of older adults become crucial as welfare services are increasingly offered “digital by default” (Schou & Pors, 2019). When citizens, including older adults, are to an increasing extent becoming “responsible for provisioning welfare services themselves” (Schou & Pors, 2019, p. 465), their relation to digital media gains in importance. Their access to digital media is not only a matter of convenience or entertainment but rather a requirement for getting in touch with health care services, for instance. Their usage of online public services is not an additional option but rather the default route for interaction with the tax agency. And whether or not they find themselves at home within the digital environment,

their actions as citizens nowadays have a digital frame. Following Schou and Pors (2019, p. 265), this creates a new ecology of citizenship within which “groups of citizens already at the fringes of the welfare system risk being further excluded.”

Referring to empirical evidence and analyses presented in this article, it is obvious that older adults with low levels of income and education, little computer experience, and weaker social networks are at risk of digital exclusion. These are important insights for both researchers and policymakers, not least in light of the fact that traditional channels over time have been aggravated. In a recent report, the Swedish National Audit Office (2021) pointed out that authorities in Sweden have significantly reduced their services for citizens to contact them, by phone as well as physically. For researchers, it is a call to keep track of problematic patterns of exclusion and perhaps also to indicate potential strategies to counteract them. For policymakers, it is a call for caution in the aspirations to make public information and services digital by default. In some ways, turning to digital solutions for information and services is probably an effective strategy. However, it is important to realise how such a strategy also comes with a price, as it threatens to also exclude important groups of citizens by making it more difficult for them to claim their social rights.

6. Limitations and Future Studies

As this article is based on data from a national survey, it manages to capture overarching patterns of older adults' experiences with digital media, from their access via their usage to outcomes of usage. These are important insights, but they are also limited in the sense that they say very little about what such overarching patterns actually mean in everyday life among various categories of older adult users. For instance, to what extent and in what ways do they also foster a sense among groups of older adults that they are at risk of being left behind in the general societal strive for digital solutions? Such insights would be valuable for evaluations of the idea of “digital first,” but grasping those calls for a very different research design, arguably a design that works closer to and pay interest in how various categories of older adults (from silver surfers to non-users) experience everyday lives with or without the ability to make use of digital services. Such research designs would include a mixed-methods approach in which survey data are combined with, for instance, ethnographic data on routine digital encounters in everyday life, or focus group data on how policy initiatives such as Digital First are perceived among various groups of actual citizens.

Having said that, we would also like to point towards the potential usefulness of international, comparative approaches. Comparing the Swedish experience of digitalisation to the experiences in other parts of Europe, as well as the rest of the world, could help bring additional insights. It would offer contextualising information

to Swedish data and insights from the Swedish case could help shed light on what are nation-specific and what are general patterns of outcomes for older adults in digitalising societies.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

Digital Media Domestication and Job Paths Among Older People: An Ethnographic Investigation

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Abstract

While it is true that ageing dramatically affects the sustainability of welfare systems, increasing life expectancy in most Western countries is also seen as an opportunity to live longer and better: The healthiest older people are also the most dynamic in terms of work activity and social and cultural capital. In this debate, media and communication technologies are often seen as tools to enable older people to age actively, thanks to their potential for inclusion. The empowerment of older people through the use of communication technologies is strongly influenced by the social and family context in which digital media are used and by the formal and informal contexts in which their use is learned. Starting from this context, this article investigates the relationship between career paths and the use of digital media among older people. We conducted 20 in-depth interviews and ethnographic sessions with Italian internet users aged over 65. The results show how their current condition (retired or employed) and the job previously held have a fundamental impact in both the processes of domestication of technologies and internet use, but also in the structuring of the home itself and the positioning and use of technologies in the domestic space of older people.

Keywords

active ageing; digital media; gender differences; information technology; job status; seniors' communication

Issue

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1. Introduction

Most countries all over the world are now ageing societies (United Nations Department of Economic and Social Affairs, 2020). Italy, in particular, is among those with an older population (Istituto Nazionale di Statistica, 2020) and is at risk of suffering negative consequences. An ever-growing number of older people entails increased welfare-related costs (pensions, health-care) and a reduction in the country’s workforce, followed by a limited ability to create new resources and wealth. However, when older people have “resources” (personal, cultural, and social) fit for active ageing, they can continue to be assets for society (Walker, 2002).

In the context of active ageing, work status is a pivotal factor, as it enables older individuals to remain “generative” in their family and social roles, as coined by Rossi et al. (2014), through the concept of old age activation or “productive ageing” as critically discussed by Morrow-Howell and Hinterlong (2001). Furthermore, in addition to work conditions, the development of digital competencies appears to impact active ageing positively. Studies suggest that using Information and Communication Technologies (ICTs) can mitigate the negative effects of ageing and promote wellness among older individuals. However, it should be noted that other research challenges the direct and definitive relationship between ICTs’ use and the well-being of older individuals,

as noted by Wei et al. (2022). Moreover, considering the growing role of ICTs in many workplaces and professions, where digital technologies increasingly dominate the job market, older individuals can benefit from learning to use these technologies effectively (Hänninen et al., 2021).

In the research on the relationship between the use of ICTs and ageing, gender seems to matter too. According to the data collected by Colombo et al. (2015), only 21.3% of Italians in the 65–74 age bracket own a PC. Of those over 65 who have never used the internet, 81% are women, and 65.6% are men. This gender gap is likely due to a different—past or current—work status: Half of older digital users (49.8%) declare that they learnt to use a PC in the workplace, and of those, 57.8% are men, while women are significantly less likely to have done so (37.6%; Kim et al., 2017).

The use of ICTs and work conditions are thus both very important aspects to consider in order to understand active ageing processes and gender differences among older people. Unfortunately, studies focusing on the relation between the use of ICTs in the everyday life of older people and their work status, or which take into account the gender factor, are limited.

To reduce this gap, the present research aims to investigate if and how work status and history, together with gender, influence access, use, and the processes of ICTs domestication in older people.

2. Literature Review

An increasing body of empirical research has addressed the adoption of ICTs among older individuals to promote active ageing (Colombo et al., 2015). Several studies have investigated the impact of ICTs use on various aspects of older individuals' quality of life, including mental wellness, social relations, level of independence, and personal autonomy, as evidenced by Sims et al. (2017) and Wright and Query (2004). Additionally, numerous studies have explored the effects of work conditions on the ageing processes, particularly in relation to ICTs use. These studies shed light on the literacy processes of older workers in the context of ICTs and their relationship with occupational well-being. ICTs seem to specifically alter the work context, and their use at a later age positively impacts employment status and career (Charness, 2006). Biagi et al. (2013) stress how older employees who can use a computer at work have more chances to be kept in the workforce longer, thus postponing retirement while still feeling active, useful, and motivated. Also, Friedberg (2001) notes that older employees who are unable to use a PC are more likely to retire early, and other studies find a direct connection between low technological competencies and low professional fulfilment in older workers (Schleife, 2006). They have ICT knowledge that is inferior when compared to their younger colleagues. This could determine, in the medium term, a polarization in the job market among older professionals between those who can keep pace and those who are unable to meet

the new requirements and therefore are at risk of being let go, demoted, or receiving a pay cut (Caparrós Ruiz, 2020). Zaccaria et al. (2022) examined digital competencies in older employees in relation to their professional profiles. According to their study, higher qualified positions require higher IT competencies, not only in the service sector but also in traditionally less innovative fields such as the industry.

Of the studies looking at the current work condition of older digital users, few are trying to understand how ICTs are overall intertwined with the professional history of present and former older employees, or how different career trajectories are related to gender. Based on the available, albeit limited data, it can be seen that previous work conditions may influence the adoption of ICTs among older individuals. Specifically, working in an office at the white-collar level has been identified as a potential factor that can impact older people's internet use, as highlighted by Arief et al. (2018). For example, competencies acquired at work, such as digital elaboration of texts and spreadsheets, use of e-mails, video calls, and internet surfing, can affect older people's various modes of ICT use outside the workplace (Cavapozzi & Dal Bianco, 2021). Retirement tends to reduce IT literacy and frequency of internet use regardless of gender (Cavapozzi & Dal Bianco, 2021). Moreover, according to Cavapozzi and Dal Bianco (2021), the negative effect of retirement on ICT knowledge is more relevant to office workers whose jobs involved intense use of advanced digital competencies, as opposed to blue-collar workers who learned to use ICTs and continue to do so in their free time.

Overall, research on the relationship between ICTs, older people, and work background often lacks adequate attention to the gender dimension, despite the growing body of literature that emphasises the importance of gender in ICT use and the acquisition of digital skills in everyday life (Kim et al., 2017).

Furthermore, the limitations of research on older people and their use of ICTs are often attributed to methodological individualism, which focuses on individual characteristics such as age, employment, ethnicity, and education, without considering the contextual and relational dimensions of ICT use (van Dijk, 2012). To overcome this limitation, we suggest reviving the theory of domestication proposed by Silverstone and Hirsch (1993) which underscores the significance of the household as a physical and symbolic space for the integration of technologies into people's daily lives (Khvorostianov, 2016).

The domestication theory offers a valuable framework for understanding the naturalisation processes of digital media in the daily lives of older people, the stabilisation of usage patterns of new devices, the social and cultural construction of their uses, and the influences of social and family networks in the incorporation of ICTs (Airola & Rasi, 2020). It presents the adoption of new digital media as an evolutionary process resulting from the domestication and re-domestication of technologies through remediation processes (Bolter & Grusin, 1998).

Currently, there is limited research that combines an examination of the work background of older people and their use of ICTs with a comprehensive approach to family and social contexts, as well as the domestic environment, which is, in turn, influenced by the work history and life trajectories of older individuals. Thus, incorporating a domestication perspective into research can provide a more nuanced and holistic understanding of the complex dynamics between older people, ICT use, and their social context.

Based on this theoretical grid, the present study intends to carry out an in-depth study of the relationship between the use of ICTs and the current—and past—work background of older people, using a research approach linked to the domestication theory (Haddon, 2000) and carefully considering the gender dimension.

3. Research Questions and Methodology

Our research aims to investigate the relationship between the adoption and use of digital technologies and the previous work conditions of older people.

In relation to the aforementioned theoretical grid, the following research questions were posed:

RQ1: How do older people’s biographies and professional trajectories affect the decision to use digital technologies?

RQ2: How do older people’s biographies and professional trajectories affect digital competencies and types of devices used?

RQ3: How does gender affect biographies and attitudes towards ICT use in adulthood?

To answer these questions, we submitted face-to-face questionnaires (between December 2013 and January 2014) nationally to a statistically representative sample of 900 older people aged 65–74, with an average age of 69.43 ($DS = 3.01$). Using the questionnaires’ preliminary data, in May 2014, we carried out 20 non-structured in-depth domestic interviews with 20 65–74-year-old ICT users, all residents of Regione Lombardia (Italy).

The qualitative snowball sampling technique was employed to select participants based on various criteria, including age, family composition, geographical context (town or city), and ownership and use of digital media and devices. Structural variables such as past and present employment, education, and income were not intentionally considered during the sampling process and may have emerged randomly from the sample. In Table 1 we have reported the main characteristics of our sample.

The approach for analysing the interview transcriptions followed the grounded and inductive method proposed by Strauss and Corbin (1994), with analytical categories being inductively derived from the data without predefining them prior to reading the interviews. Recurring categories, serving as the themes of analysis, were identified using a comparative method by the research team members. The processing of recurring data and themes was based on the original language audio transcriptions of the interviews, following the grounded theory approach suggested by Glaser and Strauss (2017). The present article will only report the ethnographic data collected during the study. The results

Table 1. Ethnographic study: Sample.

Name	Gender	Age	Current/Past employment
Ida	Female	69	Retiree/office worker
Maria	Female	65	Retiree/teacher
Mariella	Female	71	Retiree/homemaker
Irene	Female	69	Teacher
Marisa	Female	68	Retiree/office worker
Ernesto	Male	71	Retiree/artisan
Giuseppe	Male	67	Contractor (construction)
Leonardo	Male	67	Artisan
Enzo	Male	73	Retiree/construction worker
Teresa	Female	72	Retiree/homemaker
Franco	Male	66	Sales consultant
Carmine	Male	67	Insurance agent
Sergio	Male	72	Retiree/office worker
Maria	Female	74	Retiree/homemaker
Nadia	Female	65	Business owner (restaurateur)
Roberto	Male	70	Retiree/teacher
Eugenio	Male	71	Retiree/labourer
Michele	Male	68	Retiree/office worker
Bernardo	Male	69	Retiree/office worker
Giuseppe	Male	69	Retiree/office worker

of the questionnaires have been detailed in another publication (Carlo & Buscicchio, 2022).

4. Ethnography

The research aims to investigate how the adoption of ICTs among older people is affected by their biographies, how this use develops in time and space, and how media-related routines are shared within the domestic context.

4.1. Work, Retirement, and New Free Time

As shown in Table 1 and in accordance with the data on older people's employment in Italy, almost all of the interviewees are currently unemployed. They are mostly retirees with work experience, but also homemakers who have never held a stable job. Because of their inactivity work-wise, their practices and habits in media use relate to an abundance of free time.

While processing the interviews, in the first phase, we divided the sample based on time management, and the following categories emerged as themes from the analysis of our transcriptions: "free time," "freed time," or "working time."

The first category comprises all individuals who define non-working time as "free time," such as homemakers and long-time retirees: Their free time surpasses that allotted for necessary tasks (sleeping, washing up, getting dressed, cooking, doing housework, going grocery shopping, etc.) and it is a part of their daily life. This group adheres to a standardised free-time management, less variable and problematic, and more stable:

I usually start my day by getting up slowly, enjoying a calm morning. After breakfast, I like to check my Facebook for a while. Then, I usually go out for some small shopping errands and have lunch. I may take a short nap in the afternoon before spending more time on the computer. Later in the day, I go to pick up my grandson, and when my daughter comes over, we have dinner together. We usually watch television in the evening, and I might spend a little more time on the computer before going to bed. (M, 71, retiree/labourer)

The second category, "freed time," includes newly-retired individuals (in some cases retired with part-time work). Their perception of free time is deeply affected by the opposition between before ("when we used to work") and after ("now that we don't work anymore/work less"). For some, the still-fresh change is managed with difficulty, tension, and frustration: Time freed from work is seen—more or less explicitly—as "forced inactivity" due to the loss of their productivity. Therefore they feel a great urge to employ this time usefully to avoid feeling that their free time is "too" void: Free time has significance for all older people, but in particular, for recent retirees who are experiencing a period

of transition, for them it is strongly connected to the realisation of their new identity as a non-worker. They feel unproductive, exiled from the world of "doing with purpose" to that of "doing just for doing" and "doing to pass the time."

Lastly, we grouped into a third category all older people who continue to work, although at a less intense rhythm than before. Their free/freed time is managed similarly to as it had been in their working life. They are older people who spend most of their day out of the house, at the workplace, and who have yet to face the radical transformation in time management caused by retirement.

In this context, the use of digital media is part of a bigger effort to "give shape" or "give value" to time. The frequency and intensity of media (digital and non-digital) use strictly depend on the importance and the perception that older people attribute to their free time.

4.2. Professional Biographies and Forms of Digital Appropriation

The interviews allowed us to outline three distinct older people profiles: Older "white collar" retirees (teachers and office workers in the 1990s); older "blue collar" retirees, i.e., labourers and homemakers in the 1990s; and older people who still work.

4.2.1. Older "White Collar" Retirees

It is the most significant among the interviewees. A good number of those older people who are now digital users started to employ ICT in the workplace:

At work, toward the end of the 1980s, we started to use terminals for data input; there was no internet and such. I remember I was one of the first in the office to do so; it was a shock for many of my colleagues. (F, 68, retiree/office worker)

They are older people (mostly men, with a residual number of retired women ex-professional workers), former office workers, teachers, and professionals of the service sector who, during their final years of employment, experienced the digital transformation of the 1990s and quickly saw typewriters replaced by word processors, written notes by e-mails, manual calculation by spreadsheets. They learnt word processing, data entry, and to use the Office suite and software for accounting and order management in the workplace. Almost all of these older people purchased domestic PCs and internet services before their network of family and friends: "By using it in the office, I quickly realised it was very useful, so around 1998, I was one of the first among my acquaintances to have internet at home" (M, 69, retiree/office worker).

IT literacy in the workplace served, for those interested in it, as a step into the digital world: Professionals

from the 1990s (older people nowadays) could grasp earlier than others the advantages of ICT adoption. This group of older individuals have now reached complete ICT domestication and has also been able to help more family members in learning PC and internet use, particularly their children, for school-related purposes:

Now he [my son] is showing me little tricks and apps, but he has forgotten that I was the one who taught him how to use the PC for homework, since in 2000 I had already been using it for a while at work, and he was still awkward about it and afraid to get it wrong. (F, 69, retiree/teacher)

These families, both older parents and children, have embraced digital technologies and have supported each other in learning how to use them over the years. Initially, the parents taught their children about information technology from an early age, and now the digitally-savvy children reciprocate by teaching their parents about new digital services. The process of adopting and learning about technologies is familiar and ingrained in the household's history, creating a sense of continuity and shared knowledge within the family. For this group, PCs and internet in the 1990s mainly represented "useful" tools needed for writing and printing documents, searching the internet for/with their children, sending the first e-mails, keeping track of the family's budget, archiving digital files—their domestic use implements skills learned in the workplace and—at least at first—leaves little to no time for leisure:

I was already using the PC at work, so at home, I only needed it for stuff I couldn't delay, like getting the train timetable, checking my inbox for new e-mails, and searching for a restaurant address; and it was 5 minutes max. (M, 72, retiree/office worker)

The role played by technologies in older people's everyday life evolves when they retire: it acquires a new meaning given the huge amount of available free time. The task-based approach (processing data through software created in the 1990s such as the Office suite) is complemented by a time-spending, leisure-oriented one that entails a progressive switch from the *PC* to the *net* world: "When I used the PC at work, it was quite restrictive, instead after I retired surfing the internet at home became a whole different matter" (M, 69, retiree/office worker).

Regardless of the growth undergone by ICTs as leisure tools, even after years have passed, there are still visible effects of the "imprinting" received by these former workers during the first phase of the ICT domestication process in the 1990s. They continue to consider the PC as an instrument that is "useful" first and "fun" next. They are used to employing the PC for online eCommerce, eBanking, eGovernment, and eHealth services: As individuals, they were enthusiastic witnesses to the potential of the PC and internet to complete rou-

tine bureaucracy-related duties when dealing with public administration offices, banks, energy providers, online retailers, etc. From this viewpoint, the desktop PC is still the terminal needed to access a series of important services and thus simplify day-to-day life, just as it was in the 1990s for office-related matters.

An additional continuity link to their past use of the PC is represented by the prevalent setting and time chosen by the present-day older people: The PC is mainly used in the children's (now living on their own) bedroom or likely in a separate room, significantly referred to as "the office" or "the study." The dynamics of technology use in these families have shifted over time. Previously, the computer in the household was primarily used by the children, but now it has become the domain of the (new) parents. The children's room has undergone a transformation and has been revalued with a new function as the parents take on the role of technology users, reflecting the changing dynamics of technology adoption within the family: "My son's bedroom has now become my new retiree's office, I have the quiet I need, and nobody bothers me there, I've got my PC, my printer" (M, 68, retiree/office worker).

Such rooms are actually quite often very similar to proper offices, where the desktop PC with its set-up (printer, keyboard, mouse, USB ports, etc.) is the real IT device around which all ITC practices revolve: smartphones, tablets, and even laptops are still seen as "playthings" not suitable for completing complex tasks.

As regards the times of use, it is interesting to notice how they, for the most part, overlap those of a regular office schedule (morning-to-afternoon times on weekdays), while evenings and weekends are reserved for spending time with the spouse and the family (watching TV, going out), and the PC is turned off (just as when they used to be employed):

I really keep an office schedule: when I wake up in the morning, I turn on the PC, then I'm back at it after lunch, then I take a nap, and then I use it again until dinnertime...I'd say I usually spend 6–7 hours per day at the PC. (M, 72, retiree/office worker)

4.2.2. Older "Blue Collar" Retirees

They are workers who, up until the 1990s, had been employed in positions that did not require being able to use a PC (factory workers, artisans) or those who were not employed (homemakers, mainly female)—they did not learn how to use ICTs in the workplace and only recently started to use digital media: "I'd never used a PC before, I was a mason; didn't need it much, didn't need it at all" (M, 73, retiree/construction worker).

Many of the school-aged children in this group of older people had not been active users of computers in the past, and thus had not been a catalyst for the digitalisation of their families over the years, as observed in the previous category of older people.

Within this group, there is a notable awareness of the technological gap they face compared to their peers who had more opportunities to use ICT in their lives. This awareness is often more pronounced among women, who attribute their lack of familiarity with ICT to their roles as housewives. Older women, in particular, are conscious that they have experienced the digitalisation process to a lesser extent than men, due to their previous job positions: “I’ve always been a housewife and, up until now, there hasn’t been a need for a computer...maybe now with recipes on the computer, things will change...[laughs]” (F, 71, retiree/homemaker).

Their former profession is considered the determining factor in tracing a life trajectory more or less touched by the digital media world:

I look at my friends and relatives who used to do a desk job and already 10, 20 years ago had a PC at home: I started to use it only two years ago, and for me, it was literally the first time sitting down and typing. (M, 71, retiree/artisan)

They are older people who have only recently acquired a PC at a time when their children already live elsewhere. Therefore, the impulse to make a purchase comes not from a real necessity but rather from a general curiosity toward the new digital world and a vague desire to keep up with the times. They decided to get a PC and an internet connection after reading newspaper articles, watching TV broadcasts, or through acquaintances who are frequent users. Still novices to the digital world, their approach is explorative and tentative due to quite basic digital competencies. They retain a certain enthusiasm for the possibilities opened up by the internet, also in terms of public utility services, but their main reason for using ICTs is leisure: “I have to admit that in the end, I spend a lot of time playing games and quizzes” (F, 74, retiree/homemaker).

Because their use of PCs and the internet is brand new and their children do not live in the house anymore, these older people are largely self-taught: “I took my time, and I learned by mistake, on my own, like I always did with everything in my life, even work” (M, 73, retiree/construction worker).

They sometimes feel compelled to attend IT literacy courses, putting themselves in a “training” perspective interestingly not so dissimilar to what is required when starting a new job:

My children got me a PC for Christmas, and I told them, “ok, but I first need a course so that I don’t make mistakes.” I was worried to be no good. So I enrolled, and now I can use it. It’s like a new job; before you start, you have to go to school and learn how to do it. (F, 72, retiree/homemaker)

A professional background lacking office experience means these older people are initially faced with an often

serious difficulty handling a keyboard and mouse and coordinating their fingers when typing. It is not a coincidence that most of them lean toward “touch” devices such as tablets and smartphones, which are more intuitive and easier for those who have never owned a PC:

For me, the PC is something completely new, and also the keyboard; I never even used a typewriter when I was young. That’s why I decided to buy a tablet, you just use your finger, and it’s the same; actually, it’s better. (M, 71, retiree/artisan)

Not having or under-using the PC in favour of a tablet brings to the table a series of differences also in terms of services utilised, since the use of words and data processing software (e.g., Word Office and Excel Office) is drastically reduced, and digital activities are almost entirely limited to the internet and a few specific apps (Facebook, Whatsapp, YouTube, selected apps for public utility, financial and phone services, and games). In this instance, we are considering users who only partially exploit the potential of the net; those who access a restricted variety of services with a clear preference for entertainment and social content. Where older people falling into the first category mainly see ICTs as a world of useful services and information (and of tools to perform better, as is the case for the third group), the present typology of older people is most of all drawn to the internet and the digital context for its leisure and time-passing value.

The limited usage of PCs and the widespread reliance on mobile digital media devices also influence the spatial arrangement of the home. There is no longer a need for a designated “place” to use a PC or a bedroom converted into a study.

Any location within the home can be used for utilising tablets and smartphones, which in turn affects patterns of usage time (often extended), labels associated with ICT usage, and family routines: “For instance, my husband often watches TV, and I sit nearby with my tablet. There have been times when I even used it while we were eating, but I realised it was becoming excessive and decided to stop” (F, 72, retiree/homemaker).

4.2.3. Older People Who Still Work

As shown in Table 1, this category includes the lowest number of older people, those who were still active workers when the interviews took place. This condition has a strong impact on the management of free/freed time and on ICTs use. These individuals (mainly male) have considerably less free time compared to retirees and are often out of the house and at the workplace. These older people use the internet during their limited free time, typically on weekends, they access it from a home computer shared with their partner and children.

An initial dividing criterion within this group is between those working in a position entailing ICT use

and those with jobs that do not necessarily require a PC or the internet. The first individuals are office workers (insurance agents, consultants, brokers) who use the PC for contacting clients/providers but also for managing applications and software specific to the job. They show high skillsets and heterogeneity of ICTs uses—their professions were key in keeping them up-to-date, frequently even in a sort of competition with younger generations of colleagues:

I'd say that I don't have big problems with technologies; I simply grew and grew old with them, and at work, whether it is to manage orders or to use the tablet for presenting offers, I don't feel less capable than my younger colleagues at all, they are faster, but I have more experience. (M, 66, consultant)

The ability to use ICTs in the workplace transfers to the private sphere, although the reduced time availability does not allow for much use for leisure-oriented services:

I work all day long in front of a PC and in the evening I turn everything off, even my mobile. To me, the PC is a work instrument, and that's all; my wife takes care of looking up the grandchildren on Facebook, because she has more time and is better than me with this stuff, but when it's time to file the tax income she passes the mouse back to me. (M, 66, consultant)

These older people employed in highly-digitalised positions are, therefore, very competent users of the Office suite and other work-related software but are less secure (and involved) regarding social media:

I can file an insurance policy form in a flash, but when it comes to uploading pictures on Facebook, I'm always afraid of making a disaster, but maybe it's more important to know how to use the PC at work; all the rest is nonsense I don't really care about. (M, 67, insurance agent)

The second sub-group includes still active older people who work as artisans, small business owners, restaurateurs, and employees in positions which do not involve much ICT use. These individuals use ICTs mainly in their (scarce) free time, for personal matters, and only marginally for their job. For them, ICTs represent the symbol of a dangerous leap forward and the symptom of a progressive inadequacy, personal and professional alike:

I recently learned to use the PC at work by myself, but only because my accountant forced me to open an e-mail account...I'm an artisan; my customers come to the shop. My nephew gets angry and tells me, "Uncle, if you open a website, people will know how to find you," but I'm going to retire in a few years, now is not the time to get into this mess. (M, 67, artisan)

Such limited use of technologies in the workplace corresponds to equally limited use in non-work-related contexts, further hindered by the lack of free time that often makes an explorative approach to technology impossible:

My girlfriends spend a lot of time on the PC and now are very good, but I'm always busy and remain a dud: I can send an e-mail alright, or search the internet for a provider, but for me, it's really hard. (F, 65, restaurateur)

Lastly, there is a third sub-group of older people who still work, who learned to use the PC (either by themselves or thanks to a training course) as a specific choice in the perspective of a change or betterment of employment. IT competencies are considered a necessary skill to possess to stay competitive in an ever more digitalised job market:

I did it because I wanted to change jobs and my company wasn't doing so well...so, about six years ago I attended a basic IT course, in order to learn how to write a C.V., to search for jobs online...I was worried nobody would want me if I didn't know how to use a PC. (M, 67, insurance agent)

The company shut down, so three years ago, I started to work as an English teacher and translator, and I also attended an IT course because I needed it to write, translate and send files—but also to gather teaching resources and ideas online. (F, 69, teacher)

5. Results

Our study investigated personal histories and biographies that facilitated the introduction of ICTs into domestic contexts and the way they are linked to current occupation, work background, and gender.

In order to answer our research questions, we conducted an ethnographic survey to hear directly from the people involved about the ways in which ICT domestication entered their everyday life and to observe the domestic and spatial context in which this domestication took and is still taking place (Silverstone & Hirsch, 1993).

As regards the RQ1, how older people's biographies and professional trajectories affect the decision to (or not to) use digital technologies, after the interviews, results show that older people who experienced the digitalisation process in the workplace and those who are still working spend a larger amount of time using ICTs at home as well, compared to older people who had never worked in digitalised contexts or are currently retired. This fact is also supported by other studies that note how a large number of older people learned to use ICTs in the workplace (Colombo et al., 2015) and how still actively working (especially in certain sectors) can favour ICT use even outside of the home (Zaccaria et al., 2022).

In the context of RQ2, this study underscores the significant interplay between older people's professional background, current occupational condition, and adoption of digital competencies and types of devices used. Time management, which is influenced by factors such as being active at work, retired for a short or long time, and one's perception of time as "free" or "freed," has a direct impact on the use of ICTs in terms of time allocation and the type of services used, whether it's more focused on leisure or utility. For instance, female homemakers, who have family commitments and housework responsibilities, reported spending considerably less time using digital devices such as smartphones and tablets compared to recently-retired male office workers, who may have longer stretches of free time and higher levels of ICTs use, or still-working older individuals, whose ICTs use is closely tied to their work schedule.

Furthermore, there is also a variation in the types of digital services used by older people based on their professional backgrounds. Those who became digitalised at work tend to favour PCs with a traditional keyboard-mouse-printer set-up, whereas newly-digitalised older individuals use tablets and smartphones more commonly. Additionally, the latter group tends to be more familiar with leisure-oriented content, while the former, who were digitalised in the workplace and are more frequent users of ICTs, demonstrate better proficiency with utility services. Moreover, still-working older individuals in digitalised contexts often have limited time for exploring entertainment services and primarily view ICTs as professional tools.

The above results on work status related to the use of digital services align with Cavapozzi and Dal Bianco (2021), whose focus is on the double-edged effects of retirement on older people's ICTs use: On one hand, retired individuals no longer feel pressure to always be up-to-date on IT technologies and services that could determine their professional value (word processing, spreadsheet, e-mails, video calls, data input); on the other hand, exiting the occupational world increases the free time available to older people for ICT use, thus increasing their ability to learn by doing and their exposure to communication and social networking tools.

In order to answer RQ3 on how gender affects biographies and attitudes towards ICT use in adulthood, first, we must consider that the interviews have outlined the following: The large majority of the "white collar retirees" older people (highly digitalised and long-term ICT users) are males (former office workers in particular), but the presence of fully digitalised women among them is minimal. They are mostly former teachers who started using technologies at work (teaching materials such as Word files and Office-processed slides) and are still actively interested in new learning. However, the data shows that women generally possess less IT knowledge and, consequentially, fewer technological devices and a more sporadic frequency of ICT use. Indeed, this study highlights that the lesser knowledge of ICTs among older

women can be attributed to a working past that had not been digitised or provided limited exposure to digital technologies, and the effects of this can still be seen in the present. These findings are consistent with previous research that suggests the persistence of a digital gender gap among older adults, even though it may be closing among younger users. Older women tend to lag behind men of the same age in their adoption of ICTs, and this gap has become entrenched with time (Sala & Gaia, 2019). This study aligns with the "trajectory of life" perspective proposed by Kim et al. (2017), which emphasises that previous professional experiences, competencies, and knowledge acquired at an earlier age all contribute to shaping the present behaviours and attitudes towards ICTs, including gender differences in ICT use among older people.

6. Conclusions, Implications, and Limitations

Our findings shed light on the importance of moving away from an individualistic and biological approach when discussing the relationship between older people and technologies. Many studies on active ageing have been criticised for overly focusing on older individuals' personal traits and choices while neglecting the social dimension and context in which both the domestication of ICTs and ageing occurs (Carney, 2017; Tadic, 2018; van Dijk, 2012). Similarly, the use of the term "active ageing" itself may be problematic as it risks evaluating the well-being of older people solely based on their productivity, health, and individual characteristics in the present (van Dyk, 2014).

To gain a deeper understanding of how ICTs are integrated into the lives of older people, it is crucial to consider how ICTs are intertwined with their biographical trajectories beyond just their current ICT use patterns (Walker, 2002). This requires an approach that goes beyond studying the current status quo and delves into the "past," including life trajectories, work histories, media use patterns, and personal and generational histories that shape the ageing processes. Factors such as past professional experience, family relations, and spatial organisation within the home strongly influence older people's access to and use of ICTs. For example, the spatial arrangement of ICT in homes, such as having a dedicated "children's" room with a fixed computer, can significantly impact ICT use patterns, in terms of time spent and services used, compared to those who use mobile devices (smartphones and tablets) throughout the house. This highlights the importance of considering the domestication process of ICTs in older people's lives, in line with the theoretical approach of domestication, and moving beyond individualistic notions of technological gaps and inequality when studying ageing and ICTs.

It is evident that age in itself or any alleged innate difficulty toward using ICTs are not the primary influencers of older people's attitudes towards ICTs. Instead, social contexts and biographies (personal, professional,

generational, domestic) play a predominant role in shaping the presence and significance of ICTs in their lives. The study of the spatial arrangement of ICTs in homes is particularly intriguing as it reveals the acquisition processes, use biographies, history of technology adoption, and moral economies and routines associated with technology use, in alignment with the theoretical approach of domestication. For example, having or not having a “children’s” room with a fixed computer involves a profoundly different use of technologies in terms of time spent and services used compared to those who do not have such a room and use mobile devices (smartphones and tablets) throughout the house. On the one hand, this confirms the validity of a domestication model applied to understand said occurrences; on the other, the necessity to look beyond the individualistic notion of technological gaps and inequality when talking about ageing.

Furthermore, our research highlights the significant role of gender in shaping older people’s digital inclusion and opportunities for active ageing. We found that older women tend to be less involved in the digitalisation process than men, which can be attributed to differences in professional roles, education levels, family responsibilities, and job opportunities. These disparities, rooted in historical and societal norms and expectations, persist in old age and contribute to lower rates of digitalisation among older women.

Our findings emphasise the need to move beyond an age-centric approach and consider a range of factors, including social context, gender, education, and personal history, in understanding the complexities of older people’s attitudes and behaviours towards digital technologies. They highlight the importance of developing inclusive and gender-sensitive policies and interventions that address the diverse needs and experiences of older people in the digital era and promote opportunities for active ageing for all individuals, regardless of age or gender (Paz et al., 2018). This underscores the urgency to rethink digital inclusion and active ageing policies, taking into account the analysis of different ageing and ICT use processes between men and women (Kim et al., 2017; Setfester & Lovegreen, 1998). It is crucial to recognise that gender plays a significant role in shaping opportunities for active ageing and digital inclusion among older individuals and to address the long-standing inequalities faced by older women in their access and use of digital technologies throughout their lives.

Although our research has employed an accurate methodology, it is not without limitations. One limitation of our research pertains to the qualitative nature of our methodology, which restricts the generalizability of our results to other contexts, including geographical ones. Future studies could consider incorporating qualitative findings with more extensive quantitative investigations to enhance the robustness and external validity of the research.

Another limitation is related to the selection of the group of older individuals, which was carried out

using the qualitative snowball sampling technique. This approach may result in a non-heterogeneous sample comprised of individuals from similar social and cultural backgrounds, potentially limiting the diversity and generalizability of our findings. Exploring alternative sampling techniques in future research could address this limitation and ensure a more representative sample.

Finally, a further limitation is the currency of the data, which was collected in 2014. Given the dynamic nature of technological advancements and changing societal trends, conducting a follow-up study with more recent data would be valuable in examining the current state of the phenomenon under investigation.

In conclusion, while our research has adopted an accurate methodology, it is important to acknowledge these limitations as they provide opportunities for further research and refinement of our findings in future studies.

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Conflict of Interests

The author declares no conflict of interest.

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Article

Set in Stone? Mobile Practices Evolution in Later Life

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Abstract

In what ways do mobile communication practices change through later life? To what extent do sociodemographic characteristics, country of residence, and well-being relate to these changing practices? To answer these questions, we used an online, longitudinal study targeting internet users aged 60 and over in six countries (Austria, Canada, Israel, the Netherlands, Spain, and Romania). The focus is on the 3,125 respondents who declared using a mobile phone in every wave (2016, 2018, and 2020). Results show an increasing usage diversification already before the Covid-19 pandemic. A latent class analysis identified three different styles of mobile practices. The most sophisticated relies on almost all the analyzed functions, while the most unsophisticated is limited to voice calls, texting (mainly SMS), and photographs to a lesser extent. Finally, a multinomial analysis provided a picture of the individual characteristics related to the usage styles in the period. The most relevant dimensions were country of residence and age, followed by internet use intensity. The country of residence is relevant to explaining usage because the telecommunications price structure determines the priority given to the mobile phone in (senior) individuals' everyday lives. The article contributes nuanced evidence of the trajectories of digital practices in later life. At the same time, the findings support and better inform country-based policies, services, and products for more effective inclusion of the older population in today's hyper-digitized societies.

Keywords

60+; digital practices; diversity in later life; international comparison; smartphone practices

Issue

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1. Introduction

In a hyper-connected world of pervasive mobile communication, digital divides tend to affect the older population more (Friemel, 2016), an issue of concern due to the inequalities they cause. Studies focusing on the mobile phone divide as a source of exclusion find that such a divide is shaped by age, gender, income, and educational level (Hong et al., 2016; Hwang & Nam, 2017; Lee et al., 2015; Tsetsi & Rains, 2017). Moreover, while sociodemographic factors explain the mobile phone divide, an international comparison shows that national policies and culture are also relevant in shaping mobile practices (Beneito-Montagut et al., 2022). Moving beyond the con-

cerns of the digital divide, there is an increasing interest in disconnection and its multidimensionality (Chia et al., 2021). A dynamic approach can bring nuances to the study of disconnection, as the relationship with digital devices is not necessarily immovable. From our perspective, an understanding of (complete or selective) disconnection should incorporate the interconnection of, on one side, agentic and structural elements and, on the other, personal, social, and technological contexts of (non-)adoption and use (Neves et al., 2018).

We are interested in mobile communication adoption in later life from an everyday perspective. Available studies show that older individuals use smartphones less frequently than their younger counterparts (Beierle,

2021; Hwang & Nam, 2017; Lee et al., 2015) and for shorter periods (Andone et al., 2016; Parry & Sewall, 2021). Thus, age is negatively associated with usage intensity (De Nadai et al., 2019). While younger adults rely on smartphones mainly for entertainment, older adults tend to prefer seeking information and using them as a regular phone (Andone et al., 2016) and primarily for social purposes (Hwang & Nam, 2017; Lee et al., 2015). Research focusing exclusively on the older population provides nuanced results. Earlier stages of older age are more associated with the use of mobile internet, although affinity and attitudes also have an influence (Seifert & Schelling, 2015). Higher educational backgrounds enhance seniors' ability to use the internet (Hong et al., 2016), while age and education predict engagement in the social uses of smartphones (Rosenberg & Taipale, 2022). The smartphone's main purpose tends to be accomplishing practical tasks involving strong social bonds (Caliandro et al., 2021) because, as described by older users, the mobile phone helps them cope with daily living (Seifert & Schelling, 2015).

As the mobile phone is a multi-purpose device, there are different ways of approaching its usage, and one option to determine usage style is analyzing the typology of functions/features and their diversity (e.g., Falaki & Estrin, 2010; Rosales & Fernández-Ardèvol, 2019). Due to the ever-changing digital landscape, it is common to find different classifications depending on the development of the digital landscape or the analytical goals of the study (e.g., Chan, 2018; De Nadai et al., 2019; Litt, 2013; Stevic et al., 2021). Lower levels of usage diversity tend to attach to more basic usages, in extreme cases restricted to exclusively using voice calls. Conversely, the higher the diversity, the more sophisticated the usage is, as the accumulation of functions/features necessarily involves more differentiated skills (Rosales & Fernández-Ardèvol, 2019). Such an approach does not necessarily evaluate particular features or functions, which can range from gaming to emailing, or from using social network sites to listening to podcasts, to name a few. Instead, an aggregated approach avoids qualifying the degree of complexity attached to individual features or functions, as their sophistication might depend not only on the way the user appropriates them but on the particular mobile application(s) attached to that function. For instance, at present, ordinary voice calls and SMS tend to be considered basic features while e-banking would be considered highly sophisticated. Yet, it is difficult to evaluate the sophistication of other activities such as gaming or using social network sites when they are considered in generic terms. For that reason, we consider it appropriate to approach mobile phone usage as the accumulation of the used functions or features.

In the case of older people, there is a particular interest in the relationship between digitization and well-being—measured either as life or health satisfaction. However, the results are not straightforward (see a summary in Hofer et al., 2019). For instance, many

social media usages of mobile phones are positively associated with life and health satisfaction among older adults in seven countries (Rosenberg & Taipale, 2022). A study in Switzerland found a positive relationship between online information-seeking and older adults' life satisfaction (Hofer et al., 2019). Also, research conducted in Israel during the most challenging moments of Covid-19 (Nimrod, 2020) showed that a general increase in internet use was not related to an increase in older adults' well-being. Instead, the increased use of online leisure functions was the only positively related dimension. Finally, some analyses found that smartphone users might have broader social networks (Barrantes et al., 2023; Hwang & Nam, 2017; Silver & Huang, 2019), which should positively influence well-being as it enables the maintenance and reinforcement of socialization. In sum, results suggest that it is not digitization in general but particular features or functions (meaning particular goals) that positively associate internet usage with well-being.

Despite the increasing interest in studying the everyday uses of mobile phones by older people (e.g., Rosenberg & Taipale, 2022; Seifert & Schelling, 2015), scarce studies are taking longitudinal approaches. When they do, they usually rely on tracking tools (Andone et al., 2016; Caliandro et al., 2021; Fernández-Ardèvol & Rosales, 2017; Parry & Sewall, 2021; Rosales & Fernández-Ardèvol, 2019). In a longitudinal qualitative study with older adults, Pang et al. (2015) described the patterns of appropriation and disappropriation of mobile phones over time, showing a relationship to previous experiences, attitudes, and social support. Furthermore, the repertoire of popular mobile applications tends to be homogeneous over short periods (Fernández-Ardèvol & Rosales, 2017; Parry & Sewall, 2021). Studies indicate that the use of different smartphone features increases over time (Fernández-Ardèvol & Rosales, 2017; Seifert, 2022) but remains stable for the older groups (Rosales & Fernández-Ardèvol, 2019). However, these longitudinal studies usually refer to short periods, include different samples over time, or involve relatively young populations. Finally, these refer to single countries, so one particular cultural and economic context.

In this article, we analyze the evolution of the mobile digital practices of internet users aged 60 and over with a longitudinal approach, meaning that the same participants responded to a survey in three waves between 2016 and 2020. We study six countries: Austria, Canada, Israel, the Netherlands, Romania, and Spain. Available data show how these constitute relevant and diverse cases from the Global North in terms of digitization and relative cost of mobile communication compared to fixed broadband—measured as the percentage of the gross national income per capita (GNI p.c.; see Figure 1). In Canada and Romania, the price structure is detrimental to mobile communication as their basket prices are significantly higher than the fixed broadband baskets (ratio [2]/[1]: 1.7 and 1.4, respectively). However, the digitization landscape differs. Canada shows high

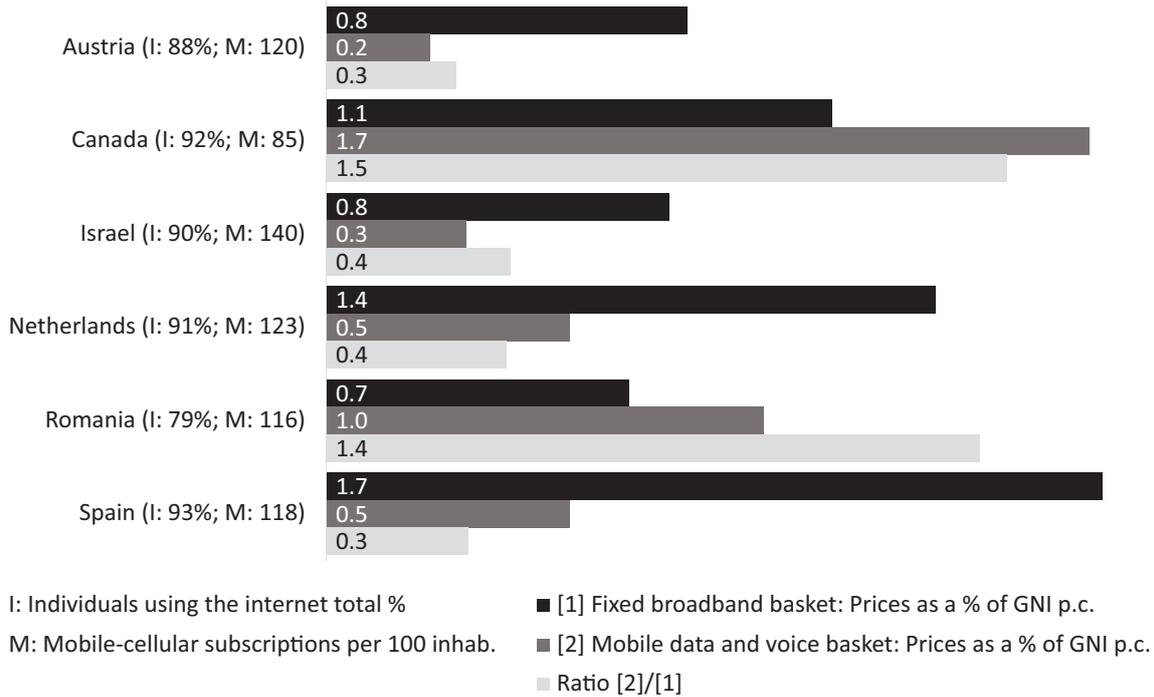


Figure 1. Digitization and telecommunication prices (selected baskets) in the studied countries. Notes: I—In Austria, the Netherlands, and Romania, populations over 75 years old are not included; [2] refers to low consumption basket (70 min voice calls + 20 SMS + 500 MB). Source: Author’s work based on International Telecommunication Union (n.d.).

internet penetration (92% of individuals using the internet). At the same time, it faces the highest mobile communication costs in relative purchase capacity (1.7% of the GNI p.c.), resulting in the lowest mobile penetration in the study (85 mobile-cellular subscriptions per 100 inhabitants). Contrastingly, in Romania, internet penetration is the lowest (79%), and relatively high mobile communication prices do not seem to prevent high mobile penetration (116 mobile-cellular subscriptions per 100 inhabitants). In the other four countries, mobile prices are comparatively lower than fixed broadband prices (ratio below 0.5). However, fixed broadband is relatively more expensive in Spain (1.7% of the GNI p.c.) and the Netherlands (1.4%) than in Austria and Israel (0.8% both). Along those lines, Alexopoulou et al. (2022) discuss how EU countries’ welfare states relate to the old-age digital divide. The EU countries in our study belong to three categories of welfare states: Austria and the Netherlands belong to the conservative welfare model, Spain to the Southern European, and Romania to the Central and Eastern European model.

The two guiding research questions that inspire our study are, first, in what ways do mobile communication practices change through later life? Second, to what extent do sociodemographic characteristics, country of residence, and well-being relate to these changing practices?

Our analysis shows how mobile digital practices are not steady. Instead, they can dynamically increase or decrease over time. Results also demonstrate how the country context is even more relevant than the tradi-

tional sociodemographic characteristics, while another two relevant dimensions to explain mobile phone usage are age and internet use intensity. Finally, traditional determinants of the digital divide are still in operation.

2. Data and Methods

2.1. Data

The data belong to a longitudinal panel study that collected data from the same participants biannually in three waves: 2016 (W1), 2018 (W2), and 2020 (W3). The data was anonymized. The initial design targeted the online population aged 60 and over (no upper threshold) in six countries: Austria, Canada, Israel, the Netherlands, Romania, and Spain (Loos et al., 2018). The questionnaire was administered online except in Romania, where a telephone-based survey was used. The data set constitutes a unique sample of the evolution of older individuals’ (mobile) digital practices from an international perspective. However, the panel did not replace participants, so it is not possible to generalize the results to the 60+ online population.

The article focuses on participants who declared using a mobile phone in the three waves. Once selected, the cleaning process included deleting cases with either inconsistent data or a significant amount of missing data in at least one wave, giving a final sample size of 3,125 participants (Table 1). The sample is distributed unevenly among countries, with almost half of the respondents located in Spain and Austria (25% and 23%, respectively).

Table 1. Sociodemographic characteristics.

N = 3,125 %	Waves (W)		
	W1	W2	W3
Country ¹			
Austria	23.0		
Canada	11.8		
Israel	13.2		
Netherlands	12.8		
Romania	13.8		
Spain	25.3		
Geography			
Big urban conglomerates	47.6	49.0	48.8
A town or a small city	31.1	29.2	29.0
Countryside	21.2	21.6	21.6
Do not know	0.2	0.2	0.6
Gender ¹			
Male	55.2		
Female	44.8		
Age			
60 to 69	73.2	62.9	50.9
70 to 79	24.6	33.1	42.3
80+	2.2	4.0	6.9
Education ¹			
Primary or less	7.8		
Secondary	52.5		
Tertiary	39.6		
Unknown	0.1		
Income			
Above the average	41.9	41.6	39.5
Similar to the average	15.5	17.0	15.5
Below the average	32.7	31.5	31.1
Unreported	9.9	9.9	13.9
Employment			
Active	20.6	15.8	10.1
Inactive	4.4	2.8	1.6
Retired or unpaid position	74.8	80.6	86.3
Other	0.3	0.8	2.0

Note: ¹ Constant over time.

Also, almost half of the participants live in large urban areas (48%). The socioeconomic characteristics reflect the existing digital divides in the studied countries and the evolution of personal circumstances. There are more men (55%) than women (45%), and the group of young older adults (60–69 years of age) shrinks over time, moving from 73% in W1 to 51% in W3. Most participants completed secondary education (53%), with 40% reaching the tertiary level. The income level remains steady, with around 40% reporting incomes above the country average. Finally, participants active in the labor market decreased from 21% in W1 to 10% in W3, while those retired or in an unpaid position increased from 75% to 86%. The remaining variables considered in the analysis

(see Figure 2) are, first of all, the set of mobile phone functions (20 categories) that determine the mobile phone usage style. Second, an index of internet use diversity based on the activities conducted online on the previous day. Third, a variable that gathers respondents' way to obtain Covid-19 updates and related information in W3. Finally, there are two indicators of perceived subjective well-being: one refers to life satisfaction in general and the other to health satisfaction.

2.2. Methods

First, we identified participants' mobile phone usage styles based on the functions collected as dichotomous

N = 3,125 %	Waves (W)		
	W1	W2	W3
Which functions do you use on your mobile phone? (multiple choice)			
Voice calls	81.2	85.7	86.6
Photos	74.2	79.0	82.3
SMS	66.4	67.9	67.3
Email	54.8	60.4	65.5
Inst mess	53.5	58.3	64.2
Alarm	58.6	57.1	55.2
Calendar	51.9	54.2	53.7
Web Browser	46.7	48.8	54.0
GPS Mapps	42.4	48.4	49.3
SNS	34.3	38.6	41.8
Down Apps	34.7	38.2	41.4
Web Apps	31.4	38.3	43.5
Rec video	34.7	30.4	34.4
MMS	21.3	22.0	22.0
TV Video	16.9	21.8	25.6
Games	17.6	19.2	18.9
Music player	14.7	17.7	19.5
Radio	15.9	16.6	16.1
Podcast	2.3	3.5	6.0
Other	1.6	0.9	1.3
Internet use diversity (index 0 to 10) Mean (SD)	3.6 (2.1)	3.6 (2.0)	4.0 (2.0)
Ways of gathering Covid-19-related information			
Analog media	—	—	48.4
Digital media	—	—	42.0
Interpersonal communication and others	—	—	9.5
How satisfied are you with your life as a whole?			
Low	5.5	5.3	6.1
Medium	28.6	28.3	30.4
High	65.1	65.4	62.6
Prefer not to answer	0.8	0.9	0.9
Unknown	0.0	0.0	0.0
How satisfied are you with your health as a whole?			
Low	9.6	9.1	11.6
Medium	39.1	40.9	40.2
High	50.3	49.1	47.5
Prefer not to answer	1.1	0.6	0.6
Unknown	0.0	0.2	0.1

Figure 2. Variables in the analysis. Note: For details on variable construction, see Table S1 in the Supplementary File.

categories (see Figure 2). The most convenient method is latent class analysis, a subset of structural equation modeling appropriate for multivariate categorical data (e.g., Weller et al., 2020). Latent class analysis classifies respondents (cases) according to their maximum likelihood of class membership. We relied on the polCA package for R software (Linzer & Lewis, 2011) to identify classes in W3, as it provides the most unambiguous picture of the dynamics in the studied period. Because the landscape of mobile applications changes very fast, the picture in W1 is already outdated. The model assessment relies on usual information criteria, AIC, and adjusted BIC (see Figure S1 in the Supplementary File). To allow comparison across time, we replicated the same classification algorithm for W1 and W2. We created a Sankey diagram

(Riehm et al., 2005) to illustrate the dynamic flow of participants among classes through time.

Second, we employed adjusted multinomial logistic regressions to analyze the determinants associated with usage styles. The endogenous variable was the class of belonging. A stepwise approach based on residual deviance allows for deciding what variables to include in a given model. The model specification is the same for each wave to facilitate comparison, except for one pandemic-related variable incorporated into W3. Missing values in continuous variables were imputed using predictive mean matching (Sharma, 2018). No statistically significant differences between the original and the imputed variable were found in the sensitivity analysis consisting of a comparison of distributions employing

an ANOVA test. To assess the appropriateness of model specification, we ran interaction analyses among the variables in the model. Finally, Cox-Snell and Nagelkerke’s statistics estimated the overall model fit (Hua & Choi, 2021). We employed R (version 4.0.5) and R Studio (version 1.4.1103) for the analysis and PowerBI for graphics and figures.

3. Results and Discussion

3.1. Evolution of Usage Practices (not Set in Stone)

Figure 3 gathers the three classes—or usage styles—we identified once the optimal model was determined. For each class, bars depict the different functions’ popularity and evolution along waves. Lines refer to the sample average and provide context for a more nuanced interpretation of each class. Class 1 is markedly below the average, Class 2 remains similar, and Class 3 is sig-

nificantly above it. We consider classes as appropriation styles. They move from traditional, limited usage (Class 1), where voice calls and traditional SMS are the two most used features, to advanced usage (Class 3), where at least 25% of the participants in the class use almost all the functions. In between them, Class 2 represents the average usage. Class 1 gathers all the panelists who have featured mobile phones in the sample, whereas Classes 2 and 3 imply smartphone use because of the reported functions. Several non-voice functions are at least as prevalent in these two classes as voice calls. Interestingly, taking pictures is more relevant than voice calls for respondents in Classes 2 and 3, and the array of reported functions shows how synchronous voice communication has been displaced by other activities, pointing toward forms of appropriation similar to younger age cohorts (Thulin, 2018).

Usage increases as the number of used functions increases from 7.6 in W1 to 8.5 in W3 (statistically

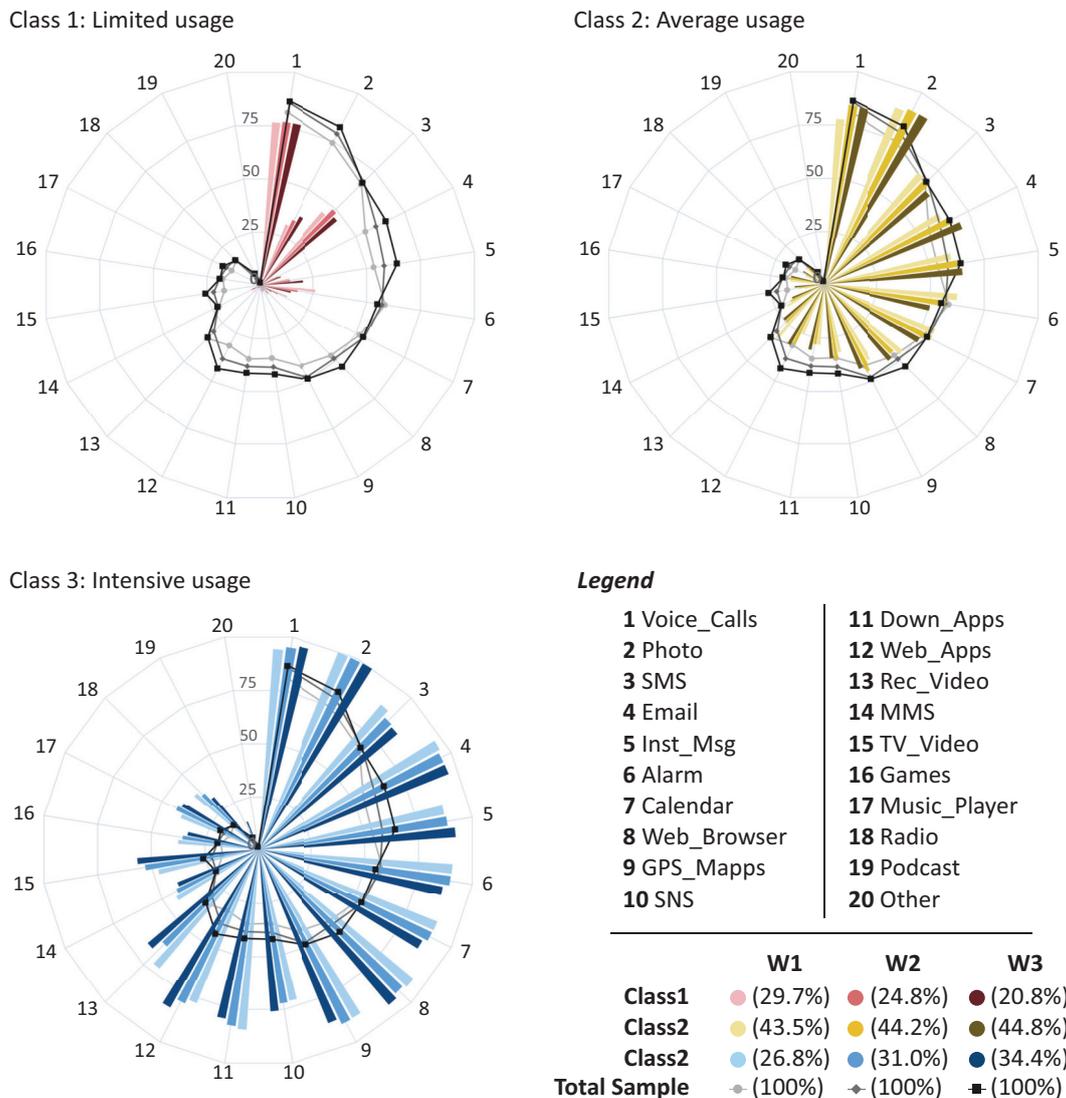


Figure 3. Mobile phone usage: Three classes, sample average, and evolution through waves. Note: See the data in Table S3 in the Supplementary File.

significant differences; ANOVA $p < 0.001$). This general trend aligns, first, with the contraction of Class 1, which shrinks from 30% of the sample in W1 to 21% in W3; second, the steadiness of Class 2 (W1: 44%; W3: 45%); and third, the expansion of Class 3 (W1: 27%, W3: 34%). An uncritical techno-deterministic approach would assume that digital practices develop and grow by default once a device becomes part of individuals' everyday lives or they acquire digital skills (Hargittai & Micheli, 2019). Nevertheless, the Sankey diagram shows a more diverse, richer picture (Figure 4). First, almost one in two participants (49%) remain in the same class during the period, meaning that usage styles are mainly steady. Second, one in four (25%) increase usage as they jump from Class 2 to Class 3 or from Class 1 to Class 2 (sometimes even to Class 3) and do not move back. Finally, some respondents move backward and forward (15%), or even just backward (11%) among classes. Therefore, maintaining or increasing mobile usage is a general trend, but it should not be taken for granted individually. Users can also step back, and we argue that this is not an exclusive behavior of later life. Changes in values and personal interests through life stages shape how individuals use their mobile phones, for example when women (Ganito, 2017) and young individuals (Syvertsen & Enli, 2020) decide to step away from using the smartphone, particularly to improve life balance (Chia et al., 2021).

It would be imprecise to frame such variability of results in terms of the decline associated with aging, as interventionist approaches would do (Peine & Neven, 2019). Instead, the longitudinal study allows observing individuals who dynamically decide how to use the mobile phone to meet their changing communication goals and interests. As discussed by Fernández-Ardèvol et al. (2017), older individuals might be the best example to interpret how individuals of any age decide how to connect to their network and the world at large as, at some point, they can filter and limit (circumscribe) how and to what extent to connect in non-face-to-face situations. Such variability must be interpreted by considering the mobile phone as another communication channel; as the current media landscape evolves in terms of devices and services, so do the particular ways individuals decide to use them (De Nadai et al., 2019; Tsetsi & Rains, 2017).

3.2. Determinants of Usage Styles: Multinomial Logistic Regressions

The multinomial logistic models report the odds ratios (ORs) corresponding to a 95% confidence interval at a 5% significance level (see Table 2). Values above (below) one reflect a positive (negative) relationship between the explanatory and the endogenous variable. The reference category is Class 2 (average usage), so results must be interpreted in comparison to this class.

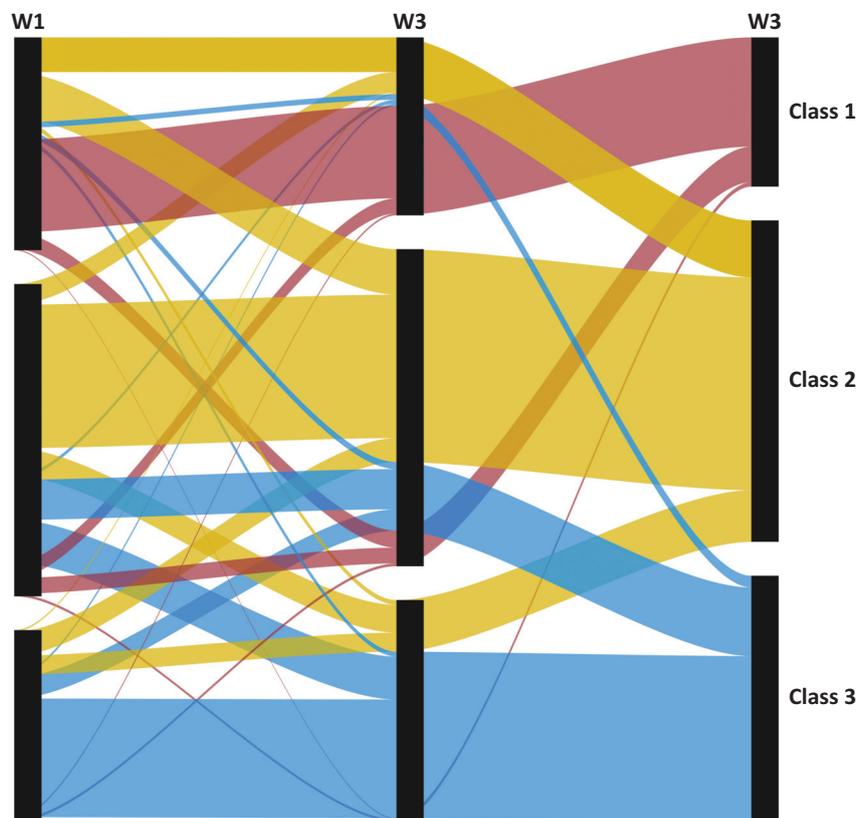


Figure 4. Sankey diagram of individuals' evolution: Usage class of belonging in each wave. Note: See data in Table S4 in the Supplementary File.

Table 2. Multinomial regressions: Class of belonging in each wave.

		W1		W2		W3	
Usage style or Class (reference: Class 2) OR		Class 1 (n = 927)	Class 3 (n = 838)	Class 1 (n = 775)	Class 3 (n = 969)	Class 1 (n = 650)	Class 3 (n = 1,075)
Geographical context							
Country (reference: Austria)	Canada	2.1*	1.5*	2.2*	1.05	2.2*	0.8
	Israel	0.6*	2.3*	0.6*	2.0*	0.7	2.3*
	Netherlands	0.9	1.0	0.9	0.8	0.8	0.9
	Romania	1.9*	0.9	2.9*	1.2	2.2*	2.0*
	Spain	0.5*	1.5*	0.5*	1.5*	0.6*	1.6*
Geography (reference: big urban conglomerates)	A town or small city	1.2	0.8	1.1	1.0	1.3*	1.1
	Countryside	1.1	0.9	1.1	0.8	1.0	1.1
	Do not know	6.5	NR	4.6	NR	2.6	NR
Digital practices							
Internet use diversity (0–10)		0.8*	1.4*	0.8*	1.4*	0.8*	1.3*
Information gathering Covid-19 (reference: analog)	Digital media					0.8*	1.5*
	Interpersonal communications	—	—	—	—	1.2	0.9
Perceived well-being							
Health satisfaction (reference: low)	Medium	0.6*	1.0	1.1	1.3	1.0	1.1
	High	0.7*	1.2	1.0	1.3	0.8	1.1
	Prefer not to answer	0.5	1.4	0.6	0.7	6.0	0.4
	Unknown		NR		NR		NR
Life satisfaction (reference: low)	Medium	1.0	0.9	0.9	1.1	1.3	1.4
	High	1.0	0.9	0.6	1.1	1.1	1.6
	Prefer not to answer	1.1	0.7	2.0	0.8	0.2	1.6
	Unknown		NR		NR		NR
Sociodemographic variables							
Sex (reference: male)	Female	1.0	0.8*	0.9	0.7*	0.8	0.8*
Age (reference: 60–69)	70–79	1.5*	0.6*	1.4*	0.7*	1.3*	0.8*
	80+	3.1*	0.3*	3.0*	0.4*	2.4*	0.2*
Education (reference: primary or less)	Secondary	0.9	1.2	0.8	1.3	0.7	1.0
	Tertiary	0.8	1.5*	0.6*	1.4	0.7	1.4
	Unknown		NR		NR	0.6	NR
Income (reference: similar to the average)	Above the average	0.7*	0.8	0.7*	1.2	0.8	1.4*
	Below the average	0.9	0.8	0.9	1.1	1.5*	1.3
	Unreported	0.9	0.9	0.8	1.1	1.3	1.2
Employment (reference: active)	Inactive	1.3	0.8	0.7	0.7	1.0	0.5*
	Retired or unpaid position	1.4*	0.8	1.3	0.7*	1.1	0.5*
	Other		NR	1.4	NR	1.1	0.6
Intercept (reference: Class 2)		1.4	0.1*	1.0	0.1*	0.8	0.2*
Model fit							
Cox Snell (< 1)		0.271		0.274		0.269	
Nagelkerke (0–1)		0.307		0.310		0.306	
AIC		5,845.0		5,807.3		5,720.8	
Residual deviance		5,733.0		5,687.3		5,588.8	

Notes: * $p < 0.05$; the em-dash (—) indicates the question was not asked; NR indicates the data was not reported due to a reduced number of observations.

First, in terms of the geographical context, the only dimension contributing to explaining usage styles is the country of residence due to differentiated telecommunications price structures. First, Canada, with high internet penetration, constitutes a singularity. The country has expensive (voice and data) mobile communication prices in local purchase capacity terms. In addition, digital landline-based communications are comparatively cheaper. Such a context would justify the higher odds for a limited mobile phone usage style (higher OR values for Class 1 in all the waves), as Canadians might prefer cheaper options to fulfill their communication goals (Sawchuk & Crow, 2010; Sawchuk & Lafontaine, 2020). Second, Romania shares the highest odds of limited usage with Canada in all the waves (higher OR values associated with Class 1), but the country context is substantially different. Among the countries in the study, Romania has the lowest levels of individual internet users and mobile broadband subscriptions, with relatively high telecommunication costs. These would justify the trend toward limited mobile usage in all the waves. However, after the Covid-19 outbreak, some changes appeared in 2020. Romanian respondents increased their odds of intensive usage in W3 (2.01 in Class 3), meaning that some participants intensified their mobile phone usage. The situation might respond to the imposed social isolation together with a lack of access to landline-based internet.

Third, Israel and Spain exhibit intensive usage. Both have higher mobile data broadband subscriptions than fixed ones and lower relative mobile communication prices. Notably, respondents are more likely to belong to Class 3 and less likely to belong to Class 1 vis-à-vis Class 2, with Israelis showing higher odds of using the mobile phone more intensely (OR values for Class 3 equal or over two). The result aligns with older people's preference to rely more on mobile than landline-based digital communications in these two countries (Central Bureau of Statistics, 2021; National Statistics Institute, 2021). Finally, the Netherlands and Austria appear to move together as there are no significant differences (non-statistically significant ORs for the Netherlands). These two countries, in the same welfare regime, show a more balanced mobile and fixed internet usage.

Second, regarding digital practices, results show that higher levels of internet use diversity increase the likelihood of belonging to Class 3 (intensive usage). The opposite applies to Class 1 (limited usage). Because the mobile phone is not an isolated everyday device, there is a positive relationship between mobile and internet use intensity, indicating complementarity, not displacement, within digital repertoires (e.g., Hänninen et al., 2021). Along those lines, in 2020 (W3), participants that rely on the internet to obtain information regarding Covid-19 issues are more likely to have a higher intensity of mobile phone usage (Class 3), meaning that their communication styles are aligned regardless of the particular communication goals.

Third, regarding perceived well-being, life satisfaction is independent of the usage styles (OR parameters not statistically significant), whereas health satisfaction is in most cases independent. Higher levels of health satisfaction are associated with a higher likelihood of average usage (Class 2) vis-à-vis limited usage (Class 1) but only in W1. The OR parameters associated with both well-being dimensions change magnitude over time, suggesting a non-steady relationship with use styles. Available evidence shows particular links between given functions and perceived well-being (Hofer et al., 2019; Nimrod, 2020; Rosenberg & Taipale, 2022), whereas the models consider usage in aggregated terms. Results for the aggregated usage suggest that instead of the intensity of mobile phone usage, what counts should be the meaning individuals place on this particular form of mediated communication (Chan, 2018; Stevic et al., 2021) and, particularly, but not only, if it is used to reinforce existing social networks (Barrantes et al., 2023). This means well-being does not necessarily correlate with usage intensity, which is relevant to avoid techno-deterministic assumptions in the relationship between well-being and digital communication.

Finally, the sociodemographic characteristics operate as control variables and align with expected results reflecting the digital divide dimensions (Hong et al., 2016; Taipale, 2016). First, Class 3 is more masculinized than Class 2 (OR < 1), confirming a gender divide that takes longer to close in older ages (Friemel, 2016). The comparatively more feminized style is Class 2, which appears to be aligned with some studies that argue women tend to show less sophisticated usages (Ganito, 2017). Second, participants are older in Class 1 than Class 2, although the reduction in the parameters—mainly in the 80+ category (W1: 3.11; W3: 2.44)—points toward some convergence in age. In contrast, Class 3 gathers the youngest participants, confirming that younger respondents declare higher usage intensity (De Nadai et al., 2019). Third, limited usage (Class 1) relates to income levels below the average (above the average: 0.7 in W1; below the average: 1.45 in W3). Fourth, the educational attainment that best appears to explain class differences is tertiary education, as some parameters are statistically significant. Overall, the class with the lowest educational attainment would be Class 1 (all OR < 1), whereas higher educational attainment associates with Class 3 (all OR > 1). Finally, those who are not active in the labor market show limited or average usage styles, a trend that intensifies over time (Class 3 with OR < 1).

4. Conclusions

We relied on a unique longitudinal study targeting internet users aged 60 and over in six countries (Austria, Canada, Israel, the Netherlands, Spain, and Romania). Our analysis focused on the 3,125 respondents who declared using a mobile phone in all the waves (2016,

2018, and 2020). We identified three different styles of mobile practices that serve as key indicators of usage: traditional or limited usage, average usage, and advanced usage. The first relies primarily on voice calls, texting (mainly SMS), and photographs to a lesser extent. Moreover, the other two show an incremental use of non-voice applications linked to the smartphone, while the advanced usage style constitutes a form of appropriation similar to younger age cohorts.

The first research question focused on the ways mobile communication practices change through later life. Results show a general trend toward an increase in the average number of mobile phone functions used among older individuals—even before the emergence of the Covid-19 pandemic. Moreover, the analysis of the usage styles evolution provides a more nuanced picture. Few participants declare a usage contended to feature mobile phones, meaning that a majority have smartphones connected to the internet. Mobile practices, far from immovable, change over time and do not necessarily follow a linear script. Remarkably, while half of the sample remains steady in terms of usage styles (49%), the other half jumps forward (25%) or backward (11%), or forward and backward (15%) between usage styles. Therefore, regarding the first research question, we conclude that mobile practices are not set in stone. Not even in later life, as this research demonstrates. Such a result should be considered to analyze disconnection and reconnection as an agentic way of relating to the mobile phone in later life.

The second research question aims at determining to what extent sociodemographic characteristics, country of residence, and well-being relate to the described changing practices. We demonstrate that the country context is even more relevant than the traditional sociodemographic characteristics to explain usage styles. However, results show how digital divides, and particularly mobile divides, are still in operation—with gender and age being the most relevant factors. Nevertheless, the cross-country analysis is fruitful in showing how price structure plays an essential role in the universalization of access, meaning that affordability is also a key element of the digital divide in the Global North. When mobile data is comparatively more affordable than broadband internet, older individuals tend to use the mobile phone more sophisticatedly, as high prices in broadband internet constitute a barrier to adoption (International Telecommunication Union, n.d.). Digital practices and mobile usage are related, and this research confirms the evidence. Therefore, when there are previous digital channels, once the mobile channel is appropriated, it is used to complement not replace other digital channels. Thus, beyond the mobile phone, we can infer that digital practices, in general, are also dynamic and change through time. Further research should be conducted to better understand their combined dynamics over time because individuals combine digital devices in their everyday life. For instance, it is common to use

different devices to access social network sites, send emails, or watch multimedia content. And while calling might be linked to the mobile phone, a computer tablet is now a good alternative as sometimes regular calls and those using platforms such as WhatsApp become indistinguishable. Therefore, studies that focus exclusively on one device (the mobile phone, in our case) should be expanded. Finally, well-being—measured as life and health satisfaction—is not necessarily associated with mobile practices when considered in aggregated terms, as in this study. Again, further research should explore specific goals of smartphone usage concerning well-being.

The main limitation of the study is the lack of representativeness of the sample. Besides, as the focus was on internet users in W1, the study is not able to capture the dynamics of mobile phone users who might start using the internet during the observed period. A strength of this longitudinal study is that it naturally caught the Covid-19 pandemic, the lockdowns, and the associated process of accelerated hyper-digitization as the last wave of data collection was conducted in November 2020.

This study contributes nuanced evidence of the trajectories of digital practices in later life (still an understudied field), particularly how price structures play a key role in the universalization of (mobile) internet access. It constitutes a timely and relevant contribution to communication studies from an everyday perspective in later life. The findings can support and inform better country-based policies, services, and products for more effective inclusion of the older population in today's hyper-digitized societies.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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Article

Older Adults Learning Digital Skills Together: Peer Tutors' Perspectives on Non-Formal Digital Support

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Abstract

In later life, digital support is predominantly received outside of formal education from warm experts such as children, grandchildren, and friends. However, as not everyone can rely on this kind of informal help, many older adults are at risk of being unwillingly left without digital support and necessary digital skills. In this article, we examine non-formal digital support and peer tutoring as a way to promote digital and social inclusion through the acquisition of necessary digital skills. First, we ask: (a) What is peer tutoring, in the field of digital training, from the peer tutors' point of view? Then, based on the first research question, we further ask (b) what are the key characteristics of peer tutoring in relation to other forms of digital support? Our thematic analysis is based on semi-structured interviews ($n = 21$) conducted in Central Finland in 2022 with peer tutors aged between 63 and 84. Peer tutors offered individual guidance by appointment and also supported their peers in group-based settings. Based on our study, we argue that from the peer tutors' point of view, being a peer entails sharing an age group or a similar life situation and provides an opportunity for side-by-side learning. Although every encounter as a peer tutor is different and the spectrum of digital support is wide, these encounters share specific key characteristics, such as the experience of equality between the tutor and the tutee that distinguishes non-formal peer support from formal and informal learning.

Keywords

digital inclusion; digital skills; informal learning; non-formal learning; older adults; peer support; peer tutor

Issue

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1. Introduction

Although older adults cannot be addressed as one homogeneous group and their use of digital technologies and digital skills vary, there is still a substantial number who face the risk of digital exclusion due to poor digital skills (Reneland-Forsman, 2018; Schirmer et al., 2022). Digital technologies can have a positive impact on the lives and well-being of older adults (Forsman & Nordmyr, 2017; Hill et al., 2015; Seifert et al., 2021), whereas the lack of digital skills may prevent the use of digital technologies thus limiting older adults' possibilities to access and manage their data and participate in online activities (Takagi

et al., 2014). As new digital technologies are continuously emerging, a certain level of digital skills is required to gain access to essential digital services (Bhattacharjee et al., 2020; Llorente-Barroso et al., 2022) and be an active citizen of society (Urbina et al., 2022).

European Commission has measured citizens' digital skills in member states since 2015. In 2022, a new version of the *Digital Skills Indicator* was introduced, including five specific areas: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving (European Commission, 2022). Reflecting this, digital skills extend beyond their functional definition related to the use of

digital devices and tools. For instance, digital skills can refer to the ability to navigate, filter, and evaluate information online successfully, but it also involves digital social skills, such as the ability to interact online (Saari et al., 2022). Furthermore, digital skills are acknowledged as fundamental civic skills in a rapidly-digitalizing society (Ilomäki et al., 2016), where the functionality of everyday life depends on digital technologies (Hänninen et al., 2022).

According to previous research (Hargittai & Dobransky, 2017; Olsson & Viscovi, 2018; Takagi et al., 2014), older adults frequently struggle to familiarize themselves with digital technologies due to insufficient digital skills and limited support systems. However, older adults' use of digital technologies has increased in recent years (European Commission, 2020), raising the need for organizing digital support (Pihlainen & Ng, 2022). In Finland, widely acknowledged as one of the front-runners in the field of digitalization (European Commission, 2022), 73% of people aged 65–74 had used online banking during the past three months in 2019, a number that grew to 82% by 2022 (Official Statistics of Finland, 2023). Similarly, 21% of Finns aged 65–74 and 7% aged 75–89 had shopped online in the past three months in 2019 (Official Statistics of Finland, 2023); by 2022, the corresponding percentages had grown to 35% and 13%. Reflecting the increase in the use of digital technologies, it is important to recognize that the Covid-19 pandemic may be a significant factor behind the development as social isolation affected the use of digital technologies (Llorente-Barroso et al., 2022; Rasi-Heikkinen et al., 2022).

Regarding the research on the use or non-use of digital technologies, older adults are typically defined as those aged 65 or older (Hunsaker & Hargittai, 2018; Rasi-Heikkinen et al., 2022). This definition is supported by recent statistics (Official Statistics of Finland, 2023) that indicate individuals over 65 use digital technologies less frequently than younger age groups. In the present study, we use the age of 65 years or more as the definition of an older adult, as it is also the common retirement age among the EU member states (Finnish Centre for Pensions, 2022). In addition, the majority of participants in this research fell within this age range except for one who was only slightly below the threshold at 63 years old. However, it is essential to acknowledge that defining older adults exclusively by their chronological age has limitations, as it does not consider environmental factors, family status, or a person's perception of their health (Escourrou et al., 2022).

In later life, digital support is predominantly received outside of formal education from warm experts such as children, grandchildren, and close friends (Gallistl et al., 2020). However, previous studies (Mehraeen, 2017; Pihlainen & Ng, 2022) have shown that digital support from warm experts or other younger people may not always meet the needs of older adults. Even though digital support received from family and friends has posi-

tive features, including in-depth knowledge of the novice user (Hänninen et al., 2021), informal support cannot replace more formal training when it comes to the acquisition of new digital skills (Gallistl et al., 2020).

Concerning learning digital skills, a peer tutor is commonly defined as a person who volunteers and offers digital support to a person in the same age group and in a similar life situation (Takagi et al., 2014). In more detail, it refers to a situation where a more experienced person supports someone less proficient in digital technologies. Peer tutoring has proved to be an efficient and preferred method of learning digital skills in later life (Aavikko et al., 2022), as besides other features, peers do not use excessive jargon that may be too difficult to understand (Takagi et al., 2014) and digital support is offered with a calm pace (Kärnä, 2022).

This article aims to introduce a new perspective on peer tutoring and non-formal learning as a part of older adults' acquisition of new digital skills. Non-formal learning refers to an organized activity provided outside the formal educational system by a wide variety of institutions and different organizations (Merriam & Baumgartner, 2020; Ross-Gordon et al., 2016). There is a proven need for non-formal digital support (Pihlainen & Ng, 2022), as older adults are often obliged to rely on the digital support received from family and friends (Gallistl et al., 2020). Previous studies have produced important information on older adults as users of digital technologies (Hunsaker & Hargittai, 2018; Quan-Haase et al., 2018), as well as sources of digital support, such as warm experts (Hänninen et al., 2021; Martínez & Olsson, 2022), and different digital support needs of older adults (Hänninen et al., 2023; Hunsaker et al., 2019). However, less is known about the quality of peer tutoring, its key characteristics, and the reasons why older adults find value in helping each other and receiving support from their peers rather than younger people.

This research explores peer tutors' subjective experiences of digital support and the key characteristics of peer tutoring in relation to other forms of digital support, for example, warm experts and cold experts, such as help desks or salespeople at local shops providing digital services. Thus, we ask (a) what is peer tutoring, in the field of digital training, from the peer tutors' point of view? Then, based on the first question, we further ask (b) what are the key characteristics of peer tutoring in relation to other forms of digital support? The research material consists of 21 interviews conducted in Finland.

2. Learning Digital Skills at an Older Age

Digital support refers to assistance, help, or guidance provided to individuals with the use of digital technologies (Hunsaker et al., 2020; Marler & Hargittai, 2022). As non-formal learning has already been proven an efficient way for older adults to gain new skills and knowledge, it is important to study digital support and peer tutoring process more thoroughly (Aavikko et al., 2022;

Åberg, 2016; Takagi et al., 2014) as it is still utilized to a very limited extent.

Adult education can be divided into three forms: informal, non-formal, and formal learning (Ross-Gordon et al., 2016). Informal learning generally covers all learning that is part of our everyday lives and occurs outside formal and non-formal education (Song & Lee, 2014). In the context of digital skills, the notion of informal learning typically extends to warm experts who offer digital support to older adults (Pihlainen & Ng, 2022). A warm expert can be defined as a non-professional user of digital technologies who is close to older adults (e.g., a child, a grandchild, or a friend) and who aids them with digital technologies (Bakardjieva, 2005; Hänninen et al., 2021; Olsson & Viscovi, 2018).

Non-formal learning, on the other hand, refers to a more coordinated activity in an organizational setting outside the formal educational system (Merriam & Baumgartner, 2020). It can be provided by various institutions, libraries, and organizations (Osorio, 2008; Ross-Gordon et al., 2016), such as adult education centers and third-age universities. In addition, these learning opportunities are usually based on short-term voluntary participation without prerequisites (Pihlainen & Ng, 2022). As the sense of belonging and being part of a group or a class can help prevent social exclusion and loneliness at an older age (Åberg, 2016), non-formal learning can also positively affect older adults' social well-being. Thus, assistance with digital technologies can also be seen as one form of social support (Quan-Haase et al., 2017).

Learning in later life can be more challenging (Schlomann et al., 2022), as the aging process can cause a cognitive decline (Dumas, 2017) and affect fine motor skills (Hoogendam et al., 2014) as well as vision and hearing (Michalowsky et al., 2019). In addition to these challenges, digital support for older adults can fail because it does not consider the inevitably different lifeworlds of older adults, potentially leading to unsuccessful digital training (Schirmer et al., 2022). Thus, when learning to use digital technologies, older adults typically prefer practical digital support that is relevant to their daily needs (Ahmad et al., 2022). This is essential because older adults can be more reluctant to use digital technologies if they do not recognize the relevance they could have in their own life (Selwyn, 2004). This emphasizes the need for a digital support model that acknowledges older adults' special needs and life situations.

In Finland, digital training for older adults is mostly provided by adult education centers, such as folk high schools, third-age universities, and other organizations that offer educational activities to seniors (Kärnä, 2022; Pihlainen et al., 2021). As older adults often lack the chance to familiarize themselves with digital technologies through formal education or in working life (Kärnä, 2022), these organizations play a key role in providing digital support for older adults in Finland (Ministry of Finance, 2017). Educational intervention in later life is one of the most effective ways to support older adults'

participation in society (Lai, 2020), and digital support is an important prerequisite of digital inclusion (Marler & Hargittai, 2022). However, a significant amount of digital support is still the sole responsibility of warm experts (Pihlainen & Ng, 2022), and demand for more organized digital support remains high (Ministry of Finance, 2017).

3. Data and Methods

This qualitative research was conducted with an inductive and data-led approach. The qualitative analysis is based on semi-structured interviews ($n = 21$) carried out in Central Finland during spring 2022 with peer tutors aged between 63 and 84. The mean age of interviewees was 72. Nine interviewees were male, and 12 were female. Due to the Covid-19 pandemic, all interviews were conducted via Microsoft Teams or phone. All participants were peer tutors who offered a wide range of digital support to other older adults. Participants were recruited through the Summer University of Jyväskylä, which provides technology-related courses for older adults and enlists people to volunteer as peer tutors. The average length of the interviews was 78 minutes, the shortest being 62 minutes and the longest 111 minutes. All interviews were audio-recorded and transcribed, resulting in a total of 144,506 words. The fieldwork was conducted following the General Data Protection Regulation.

Peer tutors who participated in the study had mixed educational backgrounds, including individuals with expertise in healthcare, humanities, technology, and education. Most participants, 16 out of 21, had at least a bachelor's degree. In addition, it was common that digital technologies played a significant role in the participants' past work across various industries and professions or as a hobby. All interviewees shared an interest in volunteer work and owned multiple digital devices, which were frequently used. The interviews, consisting of 54 questions, covered what kind of digital technologies peer tutors and the tutees used in their daily digital lives and what kind of digital support was needed and sought. The participants were also asked to define peer tutoring and describe how they perceived it based on their personal experience. More specifically, the interviews included the following sections: background info, the experience of being a peer tutor, experience of aging, learning, digital inclusion, peer tutors' requirements and qualifications, and digital services in the everyday life of older adults from the peer tutor's point of view.

All interviewees were volunteers in the Geronet project, which offered training for peer tutors and those wanting to be one, aiming to increase societal equality and support older adults' independence and inclusion. The project was carried out in Finland by summer universities and Finnish National Agency for Education between 2019 and 2021. Tutors worked on the information and communication technology courses and at the help desks located, for instance, in libraries or residential care homes. It was typical that participants

had volunteered as peer tutors for several years, the longest experience being over 20 years. All names in this research are pseudonyms to protect the participants' anonymity. Two authors of this article, Viivi Korpela and Laura Pajula, have also been involved in the Geronet project between 2020–2021 as teachers and lecturers.

Our observations did not indicate any discernible effect resulting from conducting interviews remotely. All interviewees had clear instructions and prior knowledge of using Microsoft Teams and phones, which enabled low-threshold participation in a familiar online environment. In addition, this research did not collect data on sensitive or private topics, such as health or personal finances. Reflecting on this, we have no significant reason to question the reliability of the answers or the trustworthiness of the results. Also, in line with previous research (Gray et al., 2020; Khan & MacEachen, 2022), the use of videoconferencing platforms for conducting qualitative research offered a secure, accessible, and cost-effective means of data collection.

The inductive thematic analysis (Clarke et al., 2015; Terry et al., 2017) is based on interviews with peer tutors. The data was analyzed with close reading, and no specific program was used. Regarding the division of labor, the corresponding author oversaw the analysis, interpreted the findings, and drafted the manuscript. Co-authors participated in data collection, including conducting interviews, and contributed to the argumentation and development of the manuscript's structure. In the first part of the analysis, we will identify what peer tutoring is from the peer tutor's point of view, and what meanings peer tutors ascribe to peer tutoring in the field of digital training. In the second part of the analysis, we will further explore the key characteristics of peer tutoring and seek to highlight differences to other forms of digital support, such as the support provided by warm experts.

4. Results

4.1. Perceived Dimensions and Meanings of Peer Tutoring

The interviewees described peer tutoring as a shared journey, working alongside someone who knows less about digital technologies to teach them how to use them. From the participants' point of view, peer tutoring also meant sharing a similar life situation and being in the same age group, but it was also described as a companionship built on equality and shared respect between the tutor and the tutee. In addition, the informality of the peer tutoring sessions was also an important feature for the peer tutors. The interviewees stressed that there were no specific teacher or student roles between the tutor and the tutee and that peer tutoring was typically a reciprocal relationship where both were sharing their knowledge and learning new skills together. The interviewees also emphasized that peer tutors are not professional teachers, which was commonly perceived as a

strength instead of a weakness as Daniel, 71, described his take on peer tutoring:

We need peer tutors because the threshold for asking for help is significantly lower. This is true, especially when someone who is very timid and unsure asks for digital support. Professionals are professionals. They speak jargon, and it usually goes overboard.

In the interviews, peer tutors shared their experiences with two different kinds of digital support. The first form of digital support was individual peer support, which usually took place at a library with an appointment. These individual and non-formal meetings typically proceeded at their own pace in consonance with the wishes of the person being helped. The other form of digital support took place in technology courses, where the role of the peer tutor was to assist the course teacher and offer low-threshold support by sitting alongside the participants, ensuring no one got left behind. Despite the heterogeneity of peer tutoring, there were still many similarities and unifying factors. For example, digital support was generally needed with daily tasks, such as using digital services and devices, or different applications, as Elisa, 66, describes below:

Well, the most common topics are probably online banking services and e-government services. But of course, there are other things too. Questions, such as which browser is the best, how to renew a passport, or book a doctor's appointment online. And how to install applications on smartphones and such.

As the tutor and the tutee were of the same age and had an equal footing with each other, it could lower the threshold for seeking help and asking questions that people might otherwise have felt too silly to ask. From the peer tutor's point of view, this was one of the reasons why the peer tutoring model was more appropriate than other forms of digital support, such as paid digital support. Henrik, 74, for example, explained that asking for digital support from a "man looking like a Santa Claus or a woman looking like a Mrs. Claus" can significantly lower the threshold. Being the same age makes it also easier to put yourself in the other's position and to understand why learning can be more difficult at an older age (Takagi et al., 2014).

Paid digital support was not the only form of digital support peer tutors found was problematic compared to the support received from peers. According to the interviewees, older adults repeatedly faced problems when seeking digital support from warm experts. The support received from family, especially from younger family members, was commonly perceived as excessively fast, and it often left older adults wondering what had happened. From the peer tutors' point of view, this kind of digital support did not generate new skills or in-depth learning, which eventually led the older adults to seek

more appropriate support from their peers, as Heidi, 72, describes below:

The children and grandchildren do it so quickly that it's impossible to keep up with them. It just happens and there is no time to learn how to do it yourself. In that way, we peer tutors are probably better at advising older adults. We know how to put ourselves in their position and how to guide them.

Peer tutors wanted to avoid solving everything themselves on behalf of the tutee when offering digital support. In the interviews, successful peer tutoring was described with characteristics including patience, empathy, and encouragement. From the peer tutors' point of view, one important feature of a peer tutor is also the ability to read the learning situation and accommodate the other person's needs. Regarding older adults, this generally meant giving enough time for practicing and repetition and understanding that it might take more than one meeting to learn a new digital skill. According to Nikolai, 76, peer tutoring was all about giving the tutee space to learn by doing, instead of helping too much:

We have this permanent instruction in peer tutoring that the client does, and we advise. And if it doesn't work out on the first try, then we do it two or three times, as many times as it takes for the new information to become familiar.

The interviewees also shared a common view that there is insufficient digital support available in their rapidly digitalizing society. The tutors were willing to offer all the support they could, but at the same time, there was a concern about the adequacy of their skills and the ability to offer digital support. Drawing from the interviews, it was common for peer tutors to question whether they had what it took to be a tutor as digital technologies evolve so fast and the list of new digital technologies grows daily. As Anna, 74, explained it, support is not only needed by the tutees but also by the tutors themselves:

There are an awful lot of different devices, and you don't always know about all of them. When this happens, you can always ask a friend for advice. In the beginning, I wondered if I would be able to advise older adults. But the fact that I was not alone, it brought security. This is an important part of peer tutoring.

There was also concern among the peer tutors regarding the privacy of the tutees. A prevailing view among the participants was that a peer tutor should not handle sensitive and private information. However, too often, they were the only source of support for older adults who were seeking assistance with mobile banking. One of the questions that weighed on many peer tutors was whether they should offer digital support on mobile

banking because of the related privacy issues. By helping the tutees, they would have access to private information they should not see. But if they had refused to help, the older adults would have been left without support. Leo, 72, described this dilemma as a choice that had to be made between two bad options:

We do not use the online bank on behalf of anyone else. We can advise how to get there, but once you are online, we are not involved. That's the idea. But, of course, when the person asks for help, it's a very tricky place to say no.

In addition, peer tutors were anxious about the position of other older adults in a digitalized society. Based on this consensus and their experience, peer tutors recognized the importance of their volunteer work. As Olivia, 68, points out below, the role of peer tutoring is fundamental as it can offer digital support to older adults who might not be able to receive it from elsewhere:

Many have children and grandchildren far away, and there are no people in their circle of acquaintances who can help. Many are alone with these things. And then there are people whose spouses used to take care of everything, and then he or she passes away, and they are left alone.

From the interviewees' point of view, peer tutoring was also consistently described as a meaningful hobby, which meant that peer tutoring was something both the tutor and the tutee benefited from. In the interviews, peer tutors highlighted the importance of the community and the spirit of togetherness among the peer tutors. According to Helena, 69, volunteering as a peer tutor brought a new meaning to life and offered an opportunity to be useful and help others: "I have experienced it both as a meaningful and rewarding thing to do for myself. You feel that you are useful; that is the most important thing, I feel. After all, everyone wants to feel useful and needed."

According to the interviews, peer tutoring had a strong social dimension that cannot be overlooked or belittled. From the interviewees' point of view, peer tutoring was a meaningful social event for older adults, emphasizing the social aspects of non-formal learning (Pihlainen et al., 2022). This was particularly evident in peer tutoring situations, where older adults sought someone to chat with rather than support with digital devices. However, this did not hinder the learning process or prevent the gaining of new knowledge; rather, it strengthened the social dimension of non-formal learning (Åberg, 2016). As Maria, 73, explained, the social aspect of peer tutoring was a significant part of the peer tutoring and helped battle the loneliness of older adults:

Along the way, there have also been older adults who come, even though there is no real problem. They feel

it is important in another way. It may be that older adults don't meet people as much as they would want to, and they may find companionship in us.

It was unequivocal across the interviews that teaching how to use digital technologies to older adults was neither a simple task nor was it always successful. However, peer tutors agreed that older adults commonly experienced peer tutoring as better quality digital support when compared to warm experts or salespeople. Furthermore, the general sentiment was that peer tutors understood the challenges older adults faced when learning to use new digital technologies better than younger people.

4.2. Key Characteristics of Peer Tutoring in Relation to Other Forms of Digital Support

Based on the first research question, several key characteristics made peer tutoring unique and distinct from other forms of digital support. These included the equality between the tutor and the tutee, the informality of peer tutoring without formal curriculums, and the strong social dimension and sense of belonging. From the peer tutor's point of view, key characteristics also included the possibility for repetition and learning at one's own pace. In addition, peer tutors described tutoring as a reciprocal relationship where information was shared, and the tutee had enough time to learn by experimenting instead of just having the tutor solve problems on their behalf.

The peer tutors also emphasized the meaningfulness of tutoring as it allowed them to be part of a bigger group, a feeling they frequently missed, having retired. As the willingness to offer digital support was not driven by family relations or money, peer tutors offered digital support from a different standing point than warm experts or salespeople (cold experts). According to the peer tutors, this intrinsic motive for giving digital support was a unique characteristic of peer tutoring. Reflecting on this, peer tutors could be seen to operate in a manner between these two forms of digital support. Peer tutors were not warm experts, as older adults did not share an existing relationship with them. However, they were not as cold as, for example, salespeople, as there was the potential for meaningful companionship as the relationship developed further. In this light, peer tutors could be defined as not warm or cold, but somewhere in between.

One of the main key characteristics of peer tutoring was the similar age and shared life experiences, which often connected the tutor and the tutee. This distinguished peer tutoring clearly from other forms of digital support, as according to the peer tutors, family members or salespeople at retail stores were typically younger and came from different lifeworlds. As Paula, 71, specified, peer tutors were not young professionals or family members who use difficult technological terms and act like they know everything, which made the situation less complicated for older adults:

Of course, it can be easier for the older adult that we are not like the young nerds who pretend to know everything. It may not always be like this, but it's possible we are better at speaking the same language as older adults.

For many older adults, asking for help from family members or friends was not an option for a variety of reasons, including long distances or the absence of loved ones. This differentiated peer tutoring from other forms of digital support, as from the peer tutors' point of view, it was generally more equally available to all people. However, as Anna, 74, describes below, it was also recognized by the tutors that the peer tutoring model needs to be further developed, as some older adults were still excluded from the possibility of receiving peer tutoring because of their physical limitations:

Of course, one thing is that peer tutoring is free for older adults. But if it is organized in a library or somewhere else outside the home, the fact is that older adults with mobility problems are often unable to participate.

Reflecting on this, peer tutors shared the view that peer tutoring activity still needs to be further developed to better serve and reach older adults who need digital support. Nevertheless, it was hoped that a range of key characteristics in peer tutoring would remain the same. For example, the majority of the participants concurred that creating a calm and easygoing situation was the very essence of peer tutoring. It was also one of the key characteristics that distinguished peer tutoring from other forms of digital support, as peer tutors could focus on the matter without rushing.

5. Conclusions

By elucidating the potential of peer tutoring in facilitating digital skills among older adults, this study contributes to the research on older adults' use of digital technologies, expanding the understanding of the efficacy and versatility of peer-based learning models and addressing the unique challenges older adults face in the rapidly evolving digital society. In addition, this research not only addresses the largely unexplored intersection of older adults, digital skills, and peer tutoring but also holds the potential to transform educational practices tailored for this demographic by providing new techniques for learning digital technologies, consequently enhancing the digital inclusion of older adults.

This research examined peer tutoring from the peer tutors' point of view and highlighted the key characteristics which made it unique and separate from other forms of digital support. Recalling our initial questions: (a) What is peer tutoring, in the field of digital training, from the peer tutors' point of view? Then, based on the first research question, we further asked (b) what

are the key characteristics of peer tutoring in relation to other forms of digital support? According to the peer tutors, peer tutoring was a reciprocal relationship based on equality and the absence of professional roles or curriculums. It was sharing knowledge between two older adults of the same age and similar life experiences. It was not over helping or fixing the problem on behalf of the other; rather, it was learning by trial and error with the option of repeating things and taking as much time as needed to learn. In addition, peer tutoring had a significant social relevance, as it was a meaningful social event for both the tutor and the tutee. From the peer tutors' point of view, tutoring was also an important way to participate in volunteer work and meaningfully engage with society. For some, the motivation behind volunteering was more personal, as they wanted to feel useful and to be part of a larger community.

The second part of our analysis examined the key characteristics of peer tutoring. The main key characteristics that separated peer tutoring from other forms of digital support were the shared age group, the equal footing with each other, and the informality of the situation. Peer tutors typically offered digital support and focused on problem areas without any hurry. The research highlighted that this was experienced as a quality of digital support that busy children or salespeople could not match. In addition, peer tutoring was distinguished from other sources of digital support, as it was often the only source of digital support for older adults who didn't have warm experts or enough resources to seek professional digital support. The study also revealed the significance of the sense of belonging in peer tutoring. This finding agrees with previous research, as a non-formal learning environment can prevent social isolation in later life (Åberg, 2016) and provide critical social support that can help older adults better accept and use digital technologies (Tsai et al., 2017).

The findings of this study align with previous research, as older adults continue to experience difficulties in keeping up with the rapid pace of evolution in digital technologies (Loos & Ivan, 2022) and tend to seek social support for their use of digital technologies (Llorente-Barroso et al., 2023). In addition, following previous research (Aavikko et al., 2022), our findings highlight the multifaceted significance of peer tutoring and the importance of recognizing not only its impact on tutees but also the opportunities for self-development and experiential learning it provides to the tutors themselves. Diverging from previous research (Doh et al., 2015), which anticipates and observes a noticeable male predominance among peer tutors (senior technology experts), the current data presented more gender-balanced results, with over half the participants being female. In addition, the researchers discern no substantial disparities in outcomes or engagement between the genders in this study, thereby enriching our understanding of the gender dynamics at play in this context.

For future research, it would be essential to further clarify whether the older adults who received digital support from peer tutors experienced peer tutoring as casual and easily accessible as the peer tutors themselves did. As the ideals of peer tutoring may differ from the practice, we need to examine whether older adults feel that the tutor is their peer and in an equal position to them. In addition, when searching for a solution to the shortage of digital support, it is also important to ask if it is possible to offer peer tutoring for all older adults and acknowledge the possibility that the number of older adults with the needed digital skills can be very limited compared to the number of unskilled older adults who want digital support (Takagi et al., 2014).

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Conflict of Interests

Viivi Korpela and Laura Pajula have worked for the Summer University of Jyväskylä as commissioned technology-course instructors for short periods during 2019–2023.

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Article

Applicability of the User Experience Methodology: Communication and Employment Web Portal for Older Adults

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Abstract

The purpose of this study is to redesign a web portal, oriented to communication and employment management for older adults, from the perspective of user experience, using the user experience methodology. The graphic and functional elements of the platform were considered, enhancing the effectiveness of the communication and inclusion processes and accessibility to employment opportunities. The study is part of a mixed investigation, attending the following stages: (a) exploration of the users of the ServiSenior portal platform during 2021 (constituted by 11 collaborators, 15 clients, and 30 older adults); (b) documentary analysis of the state of the art of employment portals for older adults; (c) proposal design incorporating user experience improvements; (d) testing to validate the value proposition delivered to the target audience. The results obtained were taken into account in decision-making for the approach to the design of the digital portal. This proposal is theoretically based on user-centered design, from which the user experience methodology emerges, which seeks to improve the use and quality of services of digital portals centered on users, emphasizing the attribute of universal use and access. The results obtained enhance the applicability of digital tools that serve to insert a vulnerable population in work spaces, assuming as a starting point design, accessibility, and ease of use.

Keywords

older adults; senior inclusion; user-centered design; user experience; UX methodology; web portal

Issue

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1. Introduction

Given the dizzying dynamics of current communication, interaction with digital environments has become essential to carry out activities of daily life: work, education, and social relationships, among others. Therefore, the design of accessible virtual environments is essential to guarantee use and access for the greatest number of people (World Wide Web Consortium, 2018), particularly vulnerable groups, especially the elderly. The world is witnessing an accelerated aging of the popu-

lation (Economic Commission for Latin America and the Caribbean, 2014), it is estimated that by the year 2025, people over 60 years of age will represent a third of the world population, while by the year 2050, it is expected that there will be around 2,000 million people in this age range (24% of the total population; Gopal & Murale, 2018; Huang et al., 2017; Huenchuan, 2018). In this same order, in Latin America and the Caribbean, of the 652 million inhabitants in total, 12% is represented by the elderly (more than 78 million people). In Chile, the country where this study was carried out, this population has

increased notably; in 1992, the population over 60 years old amounted to 1,311,699 (9.5% of the total population), while in 2021 it increased to 3,472,243 (17.6% of the total population; Rojas et al., 2022). According to the National Institute of Statistics (2020), in 2019, additionally, the number of older people active in the labor market corresponded to 570,305, equivalent to 6.28% of the total active population in Chile.

In older adults, well-being is associated with the autonomy that they experience by being able to participate fully in the activities of their daily life, leading to improvements in their physical and cognitive abilities, and with an impact on increased longevity (Nordin et al., 2022). In this sense, to facilitate their communicative participation in digital environments, it must be effective. It must be composed of a user interface (UI), and it must offer a user experience (UX) according to their needs: simple, easy to use, and accessible. The effectiveness in communication will then translate into the acceptance and adoption of digital spaces by this group of users, improving their quality of life (Dekker-van Weering et al., 2017; Portz et al., 2019). One of the main uses that older adults make of information and communication technology (ICT) is to inform themselves and communicate with others (Nordin et al., 2022); this reinforces the need to create digital products and services based on user-centered design (UCD), that enables effective communication with this population group.

In line with this described reality, it is necessary to improve or strengthen digital platforms aimed at this age group, for whom the use of technology is considered a difficulty (Gopal & Murale, 2018; Huang, et al., 2017), which provide the employability service in an easy and versatile manner according to their needs and characteristics. In Latin America and especially in Chile, some employability ventures for older adults have emerged, such as the case of ServiSenior, whose main purpose is the insertion of older adults into the labor market (Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023), to reduce the inequality gap, both in age and economic (Jia et al., 2015). After evaluating several platforms with common purposes, this company was selected to carry out this study, due to its inclusive commitment, focused on the elderly population in Chile. In particular, it promotes the development of flexible job opportunities for older adults, who feel active, autonomous, valid, and useful for the job market, an aspect to consider since, according to the data provided by the 2017 Chilean State Census (Instituto Nacional de Estadísticas, 2018), this group is made up of more than two million people in this age range, with projections of continuing to grow.

However, it is necessary to consider that the use of ICTs has collaterally created a new social inequality called the digital gap, which affects the possibilities of use and access of vulnerable social groups, such as the elderly (Gutiérrez-Provecho et al., 2021). The foregoing is the basis of this research, which arises from the need

to break this gap and develop digital environments that allow the inclusion and equal access of all to technologies. The digital divide has become a new barrier to social integration and it is accentuated in the elderly, often caused by the insufficient availability of technologies and internet connectivity; therefore, it is one of the main challenges to forging an inclusive ICT (Amaro Agudo et al., 2020; Selwyn, 2004; Varela Ferrío, 2015). In this sense, technologies play a determining role in the social integration of seniors (Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023; Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023), given the reality of the limited access and use of technology and considering the age of the users in the preferences of use and the effect of adoption of the new media (Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023; Loos & Ivan, 2022).

The present study was oriented to redesign a communication and employability web portal for this group, based on the application of the UX methodology, which seeks to improve the quality of service of digital portals focused on users, emphasizing the attribute of universal use and access. Taking into account the constant technological advances, which have represented significant changes in the ways of acquiring products and services, the portals for the search and contracting of professional services are required by a high percentage of users, all of them with varied characteristics and needs. The use of online platforms both for job search and for requesting various services has increased exponentially in the world as a result of the Covid-19 pandemic, extending to the present (Agudelo et al., 2020; Inter-American Development Bank, 2020). Within the framework of this global health crisis and the resulting economic consequences, a high percentage of older adults seek to continue in force in the labor market (Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023), despite having exceeded retirement age. This social phenomenon is attributable to multiple factors; however, it has been enhanced by the pandemic, due to the insufficient income received by this population, through the pension systems, less presence of multigenerational households, better levels of health, and longer life expectancy (Economic Commission for Latin America and the Caribbean & International Labour Organization, 2018; Jia et al., 2015).

Based on the above, a redesign of the ServiSenior senior employability service platform was proposed, following the UX methodology developed by Ferrer-Mavárez et al. (2020, 2021), focusing on user expectations, characteristics, and needs in order to offer a better service experience. It begins with an investigation that allows to characterize the different actors who benefited from the digital service, to create a proposal aligned with the expectations and needs of the people (Jia et al., 2015). The design of this type of services, from traditional design methodologies, limitedly considers fundamental aspects of the user, such as the behavior, expectations, and characteristics of people. This

can translate into inconsistencies between usability and user needs, divorces that occur when these products are made without involving people in the design process, creating less equal and equitable proposals, which do not value the richness of diversity (Rodríguez Cely & Ospina Salazar, 2020). Hence, the importance of a UCD allows the creation of products and services by and for people, from a collaborative and participatory perspective between the actors involved: customers, users, and creators (Loebbecke & Powell, 2009).

The redesign of the ServiSenior website made it possible, based on the application of the UX methodology, to offer a website with usable and accessible features for this population (Huang et al., 2017), creating job opportunities for those who face difficulties finding employment alternatives. The term “user experience” is used in the digital industry to emphasize the importance of the pleasant experience people have in the use of a digital product, together with how satisfaction of specific needs can be generated when using it (Ritter & Winterbottom, 2017). This methodology provides a new way of thinking and rethinking digital products, through a process directed by information obtained from the users themselves, in order to understand them in order to create more efficient products (Goodwin, 2009; Mao et al., 2005; Norman, 2013). It allows interaction in an easy, comfortable, and safe way (Nielsen, 2001), in order to guarantee generalized access, under equal conditions for all (Horton & Quesenbery, 2013). Likewise, it seeks to reduce the gaps that prevent access to technological environments, which replicate the social inequalities of the traditional labor market (Gutiérrez-Provecho et al., 2021; Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023), and where the new media create a digital divide for the older audience (Galit, 2017; Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023)

2. Method

This research was oriented to the application of the UX design methodology in a communication and employment web portal for older adults in order to promote access and inclusion of users (elderly population) to employability websites (Llorente-Barroso, Anzanello-Carrascoza & Ferreira, 2023). The application of this methodology allowed making design decisions for the development of the digital product focused on the characteristics and needs of people, particularly older adults. Based on the principle of iterative development, research and design were applied involving the audience or target audience to obtain relevant information from who makes use of the digital product, in order to justify UCD decisions. In this way, the aim is to promote the development of intuitive, easy-to-use and inclusive products (Lange-Morales et al., 2013). Despite the fact that the ServiSenior portal had a responsive web design prior to the intervention of this study, the research focused its attention on evaluating it through UX and its redesign focused on the computer and smartphone versions. These criteria were considered because the UI is privileged under the premise of mobile-first, although it is accessible to multiple devices; the UX is similar for all devices, as pointed out in the study by Hussain and Mkpojiogu (2015).

The study population consisted of 56 subjects, divided into three groups (Table 1): (a) the collaborators (“stakeholders”), represented by 11 ServiSenior workers from the areas of management, production, design, and development of the website; (b) ServiSenior clients, represented by 15 users external to the organization; (c) older adults (seniors), represented by 30 internal users. We sought to know their experiences during the application process and use of the platform, in order to evaluate the effectiveness of the service offers and their experience when interacting with them. No sampling procedure was carried out since it was considered appropriate to study the total population of users reported

Table 1. Study population.

Phase	Research techniques	Users
Research and analysis	Focus group	• 11 collaborators
	Poll	• 30 older adults • 15 customers
	Customer journey map	• 4 customers
	Card ordering technique (card sorting)	• 5 customers • 5 older adults
Design	Remote associates test (RAT)	• 3 collaborators • 7 customers • 4 older adults
Testing	Usability test	• 5 customers • 5 older adults
	Heat test	• 11 customers

by the ServiSenior company during the first semester of 2021, who voluntarily participated in each inquiry technique required for the phases of the application of the UX methodology.

Based on the considerations described above, a flexible qualitative investigation was developed, whose data allow the deepening of the opinions and assessments from the perspective of the participants (Schettini & Cortazzo, 2015). Initially, the Likert-scale observation record was used, allowing observable, measurable, and replicable data to be obtained (Rivadeneira Rodríguez, 2017). In this sense, the data collected and their analysis, considering the theoretical corpus that supports the application of the UX methodology, allowed us to integrate, discuss, and make inferences as a result of all the information collected and achieve a better understanding of the phenomenon addressed. In the application of the UX methodology, the provision of various techniques and tools that allow knowing the needs of the audiences and making design decisions aligned with the characteristics of the people and the brand is relevant (Nunnally & Farkas, 2016). Accordingly, in this study, various techniques were applied within the research and analysis phase that allowed consolidating both the diagnosis of needs as well as the characterization and analysis for the development of the design. These techniques were selected under the criteria of adequacy to the digital project to be developed (Table 2).

Regarding the data collection techniques described in Table 2, to carry out the triangulation of information from the different actors involved in the process (Jia et al., 2015), the focus group allowed us to learn the service expectations of the collaborators of the company concerning the website (Ivankovich-Guillén & Araya-Quesada, 2011). The survey, carried out on older adults who are employed through the web platform and on clients (subjects who demand the service from the platform), allowed us to understand the needs and requirements according to their particular characteristics (Rubin & Chisnell, 2008), as well as developing an approach to the central information of the project, seeking to have in-depth knowledge of the perceptions, opinions, desires, and emotions of people (Goodwin, 2009; Portugal, 2013). The customer journey maps allowed first-hand knowledge of the experience offered by the website, addressing the problems or positive aspects throughout the user's interaction with the service (Ferrer-Mavárez et al., 2020; Rosenbaum et al., 2017).

Likewise, the card sorting technique was very useful to know the mental models of the users and specify the places where the contents should be organized to facilitate their location, which is based on the observation of how users group, associate, and label the content of a website (Kumar, 2012). The RAT made it possible to verify the graphic concepts and the voice of the brand to be transmitted from the moodboards

Table 2. Data collection techniques.

Phase	Purpose	Techniques	References
1. Research and analysis	1.1. Diagnosis of user needs	<ul style="list-style-type: none"> • Focus group • Survey 	<ul style="list-style-type: none"> • Ivankovich-Guillén and Araya-Quesada (2011) • Rubin and Chisnell (2008)
	1.2. User characterization	<ul style="list-style-type: none"> • Heavy user, medium user, and light user (HUMULU) method • Protopersons 	<ul style="list-style-type: none"> • Ferrer-Mavárez et al. (2020)
	1.3. Analysis of user interaction	<ul style="list-style-type: none"> • User journey map 	<ul style="list-style-type: none"> • Ferrer-Mavárez et al. (2020) • Rosenbaum et al. (2017)
	1.4. Analysis of information architecture	<ul style="list-style-type: none"> • Content audit 	<ul style="list-style-type: none"> • Jain (2014) • Kumar (2012)
	1.5. Sitemap	<ul style="list-style-type: none"> • Card ordering technique (card sorting) 	<ul style="list-style-type: none"> • Ferrer-Mavárez et al. (2020)
	1.6. Comparative analysis	<ul style="list-style-type: none"> • Benchmarking 	<ul style="list-style-type: none"> • Avegno Muñoz et al. (2019)
2. Design	2.1. Creation and evaluation of moodboards	<ul style="list-style-type: none"> • Moodboards • RAT • Toivainen et al. (2019) 	<ul style="list-style-type: none"> • Nielsen and Thurber (2016) • Ritter and Winterbottom (2017)
3. Prototyped	3.1. Prototyping	<ul style="list-style-type: none"> • Wireframes, mockups, interactive prototype 	<ul style="list-style-type: none"> • Ferrer-Mavárez et al. (2020) • Ritter and Winterbottom (2017)
4. Testing	4.1. Prototype evaluation	<ul style="list-style-type: none"> • Heuristic evaluation • Usability test • Heat test 	<ul style="list-style-type: none"> • Choroś (2011) • Molich and Nielsen (1990) • Nielsen (2001) • Sánchez Alvarez et al. (2017)

or canvases of inspiration (Nielsen & Thurber, 2016). The usability test allows us to measure ease of use through efficiency, effectiveness, and user satisfaction (Nielsen, 2001). Finally, the heat test made it possible to interpret the record of user interaction with the website interface (Choroś, 2011).

The application of the UX methodology was carried out based on the five pillars that compose it, which lead to empathize, analyze, design, prototype, and test (Figure 1). In each phase, moments of review, reflection, and changes were stipulated according to the results and feedback from users, which was reflected during the development and design of the product. In this study, the methodology (UX) was based on the necessary applicability in digital communication systems to allow the effective use and access of users (Ferrer-Mavárez et al., 2020, 2021; Nielsen & Thurber, 2016). The study focused its attention on improving the UX of the ServiSenior web portal to allow better access to communication and employability. It sought to establish effective interaction connections with the digital world, based on the design and creation of products connected with consumers (Rowland et al., 2015). It effectively responded to the postulates of design thinking and could be combined with agile development methodologies, to make the website stand out positively through a pleasant experience (Gothelf, 2014; Ritter & Winterbottom, 2017).

3. Analysis of the Results

The following results were evidenced according to the techniques addressed in each phase (Research, Analysis, Design, Prototyping, and Testing), described in Table 2 and based on the experiences of the study population: (a) collaborators (stakeholders), (b) customers, (c) older adults (seniors). They are described below.

3.1. Investigation and Analysis Phase

3.1.1. Diagnosis of User Needs

The focus group allowed a close vision of the needs and expectations of users, guaranteeing their participation, and inclusion in the improvements of the digital environment (Llorente-Barroso, Anzanello-Carrascoza & Ferreira, 2023; Llorente-Barroso, Sánchez-Valle & Viñarás-Abad, 2023). It was developed with 11 ServiSenior collaborators, through a moderated discussion where it was possible to learn about their attitudes, preferences, experiences, and expectations, through interaction and conversation around the ServiSenior web portal. The most significant results pointed to improvements in terms of usability, optimizing the user registration process, and proposing an administration dashboard with a much more intuitive UI.

The first survey was applied to 15 clients (natural persons and legal corporate profiles), a representative sample of 10% of the profile of users who contracted or requested a service from the ServiSenior platform during the second half of 2020. The application of this technique allowed us to know and infer the needs of external users, highlighting that most of the respondents (a) privilege using mobile devices, (b) are loyal to the platform and would request the service again, (c) highlight that the platform contributes to the social integration of the elderly (Llorente-Barroso, Anzanello-Carrascoza & Ferreira, 2023), and (d) consider that the platform must incorporate improvements in terms of usability.

The second survey was applied to 30 older adults in order to learn about their experiences during the application process, as well as the effectiveness of the website's service offerings. The following notable results were obtained: (a) They used mobile devices; (b) they

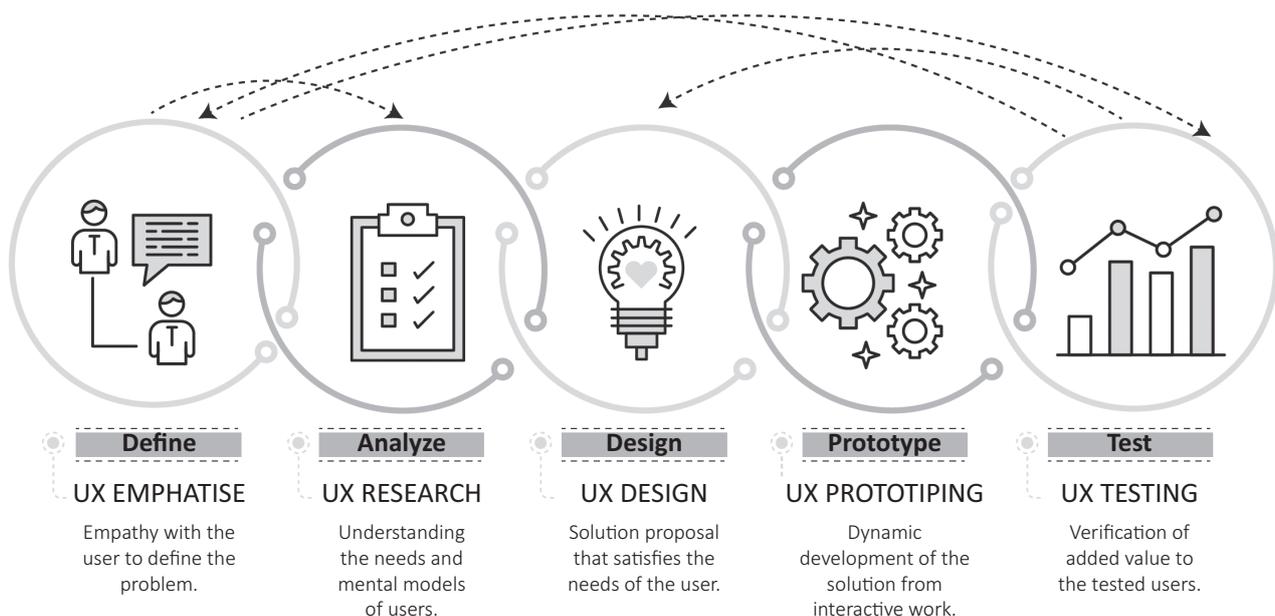


Figure 1. UX methodology. Source: Ferrer-Mavárez et al. (2020, p. 46).

used the internet to search for information in general; (c) they would preferably use the cell phone to contact family and friends, and also for the use of social networks; (d) the application process was complex for them; (e) they privilege using a laptop or computer to access the ServiSenior platform.

3.1.2. User Characterization

The HUMULU method allowed us to know the trends of each of the groups studied (Ferrer-Mavárez et al., 2020), according to the type of use they make of the ServiSenior website as well as the level of familiarity and experience with technology in general. The results of the diagnosis of the user’s needs allowed us to reflect on the characteristics of the public and the focus of the product redesign. In this sense, the collaborators were located in the category of “heavy users,” due to their high technological capabilities; the different clients were located in a “medium users” profile, considering the average understanding of ict management. finally, the seniors were placed in the “light users” category due to the infrequent use of the technologies, which implies a low experience with the platform and its technology; added to this are the capacities associated with age-related health problems such as cognition, motivation, loss of vision, hearing, and mobility (Gopal & Murale, 2018; Huang, et al., 2017; Nordin et al., 2022; Wildenbos et al., 2018).

The categorization elaborated through the HUMULU method allowed the creation of the most specific user profiles, taking into account their global characteristics (collected during user research), for which the technique of proto-persons (avatars or user models) was used (Ferrer-Mavárez et al., 2020). These are useful for decision-making in the redesign of the ServiSenior website. The proto-persons have the main characteristics and needs of the user groups, for which specific solutions were proposed, which represent premises to be considered for the redesign of the platform (Figure 2).

3.1.3. Analysis of User Interaction

The customer journey map was applied to four clients; its objective was to represent the different possibilities of using the platform, discovering the steps that users follow when interacting with it and the emotions/sensations they experience in the process. This technique made it possible to incorporate innovations in the redesign of the platform, putting people at the center, in order to overcome bad interaction experiences. For this purpose, the different emotions felt by users when they traveled on the ServiSenior website were analyzed, specifically in the search, quote, and contracting of service, while they were observed by expert UX researchers.

It was evidenced that the task of searching for a service on the web platform generates medium to bad

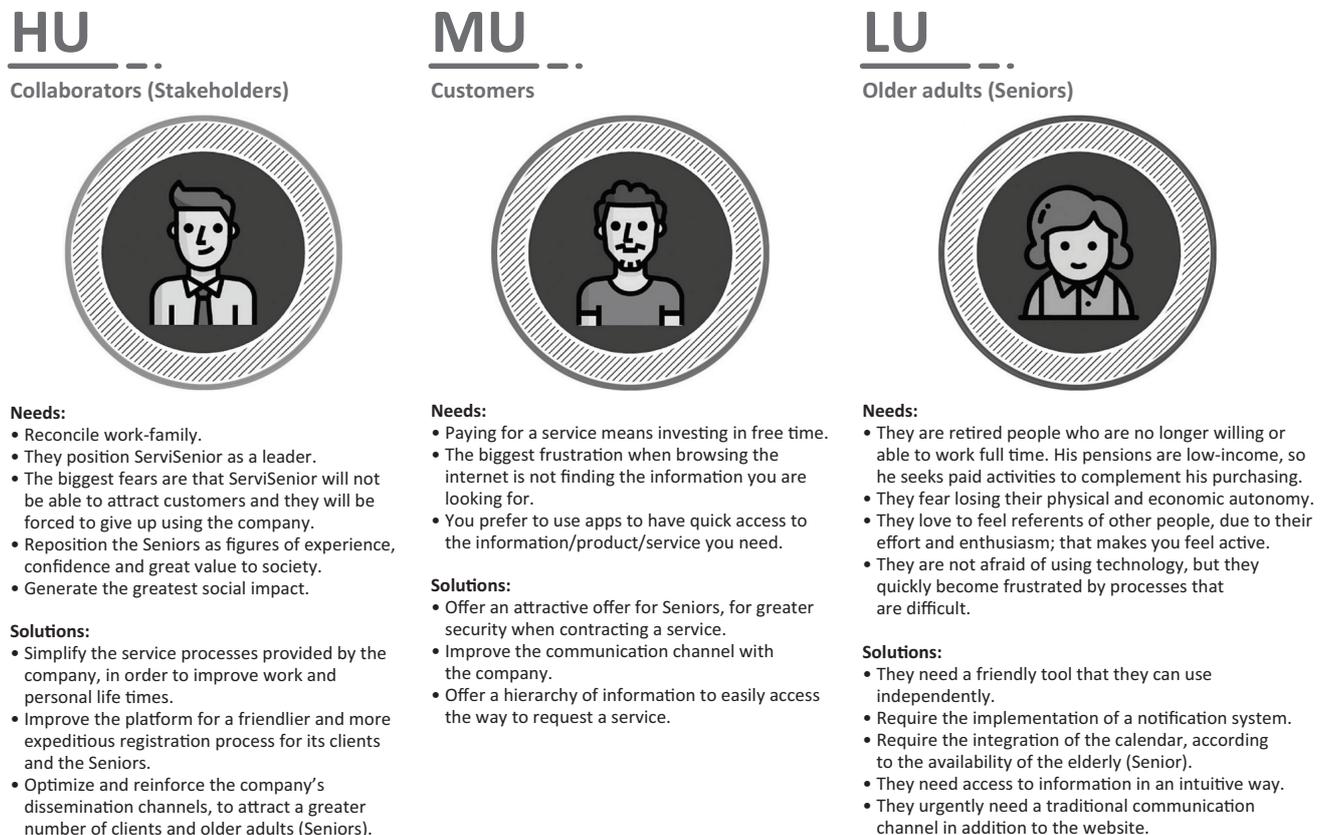


Figure 2. Characterization of proto-persons.

experiences, with the main difficulties detected being confusing information and difficulty finding the service contracting button. Those who managed to complete the task of requesting a quote for a service through the form encountered bad experiences, related to the following recurring difficulties: information that does not correspond to the contracted service, unidentified mandatory fields, and problems completing the form to process the request information. Likewise, in the payment phase, users encountered better experiences, declaring as possible opportunities for improvement the option to accept separate terms and conditions. Finally, in the scheduling of the service, the biggest UX problems were detected: the fall of the page and the non-confirmation of the data of the older adult (senior) who will deliver the service. All these problems represent usability barriers (Portz et al., 2019); overcoming them would make older adults more willing to use these technologies (Gopal & Murale, 2018)

3.1.4. Analysis of Information Architecture

A content audit (gathering of information) was made from the information (textual and graphic) that the ServiSenior website managed. It was considered relevant to review the information architecture on the website since the ease of access and findability of the content is directly related to the experience offered to the user. However, the results obtained indicate that, in information architecture, one of the most outstanding problems on the ServiSenior website is the content, since much of the information was difficult for users to find. The contents need to be organized on the basis of people’s mental models so that they are easy to find; for this, it is key to create sitemaps based on the card sorting technique.

The creation of sitemaps (diagrams of the pages of the composition of the website) is recommended, as it will facilitate navigation within it. Hence the importance of creating them from the UCD, since they are structures that arise as a proposal from the users themselves, through the ordering that they carry out of the content, grouping and prioritizing them according to the logic defined by their mental models. These criteria ensure that the content is in places accessible to people, in particular to seniors. For this purpose, 10 users are tested with the profiles of clients and the elderly, asking them to

order the cards delivered with the concepts or sections defined on the website, achieving the distribution that can be seen in the new sitemap (Figure 3).

3.1.5. Design of the Sitemap

From the results obtained after the application of the card sorting technique, the sitemap was built, taking as a premise those cards or concepts that appeared grouped in the same category greater than 50% of the time (Ferrer-Mavárez et al., 2020). For the main categories, the following sections of the website were used: Log In, Senior Application, Request Service, Companies, About Us, and Help. All the cards or concepts evaluated met the frequency criteria of greater than 50% placement in the same category. However, only the Recognition card obtained 40%, so it was decided to place it in the category where the user ordered it the most (Figure 3).

3.1.6. Comparative Analysis

From the application of the benchmark technique, the analysis of the state of the art was carried out, relating the digital products similar to the ServiSenior website, nationally and internationally. To do this, three of the job portals and service offerings with related and similar characteristics were explored: ALBA (<https://alba-app.com>), TUTEN (<https://www.zendesk.es>), and Uber (<https://www.uber.com/cl/es>). The analysis was based on the positive and negative aspects of the fundamental elements in the designs based on UX.

According to the results, it was possible to propose good practices (correct decisions of UXs) for the redesign of the ServiSenior website, following the respective analyses in Figure 4.

Finally, the preliminary results of the Benchmark analysis, allow us to mention that it is necessary to adopt solutions that meet the needs referred to by all the groups evaluated (previously explained), as well as the review carried out on the other platforms, to ensure optimal operation, in the process of interaction with users.

3.2. Design Phase

Starting from the investigative work and before designing a graphic proposal, the moodboards of the project

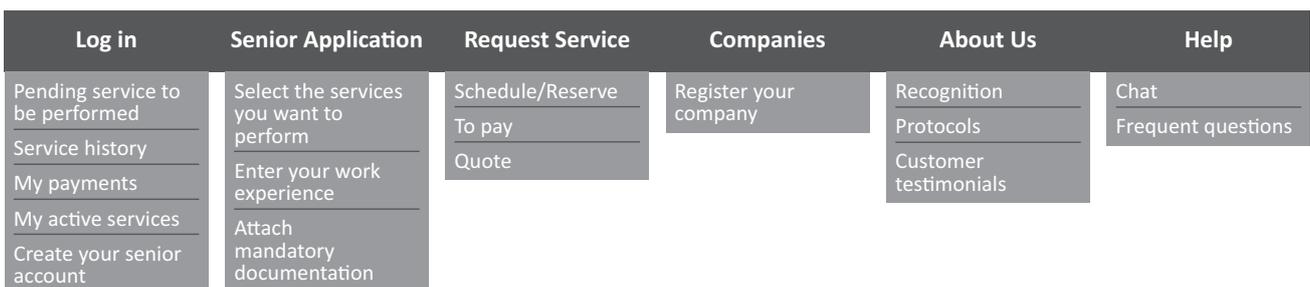


Figure 3. Sitemap for the redesign of the website.

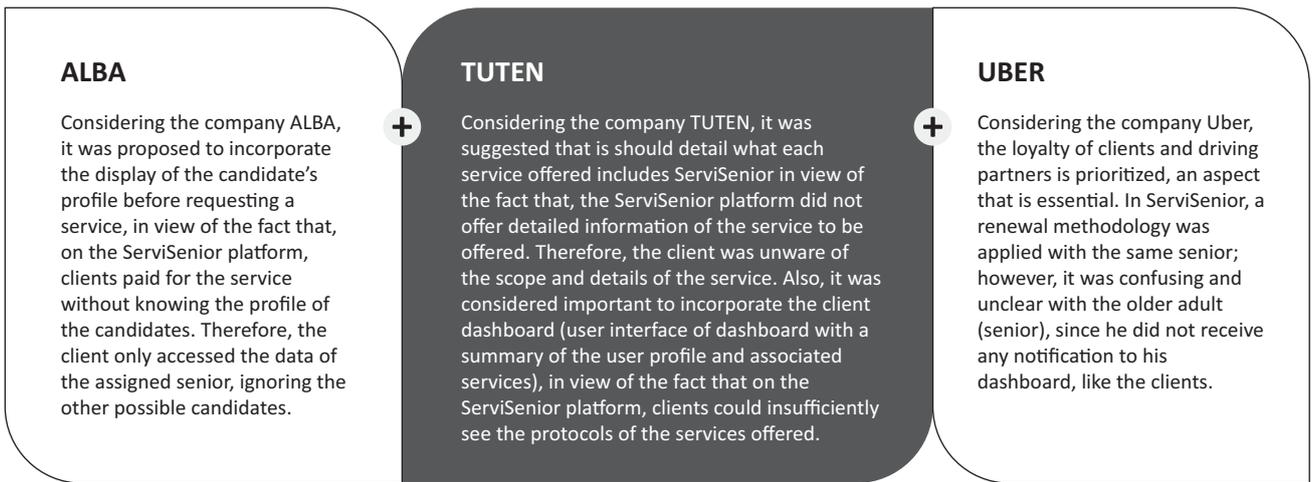


Figure 4. Results of the benchmark technique.

were created, which are defined as inspirational canvases or trend panels, elaborated collaboratively by the design team, through images and visual references, which eventually evolved into the visual style guide of the digital product (Ritter & Winterbottom, 2017). They were based on composition and collage, with the aim of transmitting the concepts that are related to the ServiSenior brand, based on user feedback. Two moodboards (Figure 5) were built.

Subsequently, the RAT was applied to test the moodboards, with the purpose of measuring the fundamental creative features of the website according to the remembrance of the users, and, likewise, evaluate their evocation with the concepts to be communicated (Nielsen & Thurber, 2016; Toivainen et al., 2019). It was applied to 14 people (three collaborators, seven clients, and four seniors), asking them to express their perception of the moodboard designs, through three words that encompass or connect their perception. The results showed that Moodboard 1 should be the one selected, taking into account the decisions of the majority due to empathy, usefulness, and understandability of the project concept and the identity image of the brand.

These results were considered for the construction of the concept in the graphical UI of ServiSenior.

3.3. Prototyping Phase

Considering the results of the application of research techniques and taking user feedback as a reference, the prototyping process began. It is defined as the creation of different scales of the design product, from the initial ideas (low prototype) to the refined and interactive graphic proposal (high prototype; Ferrer-Mavárez et al., 2020; Ritter & Winterbottom, 2017).

The prototypes were created based on the design decisions detailed in Table 3, which evolved as they were tested with users (Pinilla Gamboa, 2014). For the evolutionary process of the prototypes—low, medium, and advanced—what is proposed by Buxton (2010) and Rudd et al. (1996) is considered. It starts with the creation of the wireframes, initially represented by a skeleton where the most important elements of the UI are organized: search engine, menu, and content. Next, graphic elements, such as color, typography, and images, were incorporated into the initial skeleton, based on the



Figure 5. Proposed moodboards.

Table 3. Comparative analysis of the characteristics of the initial web portal and the redesign proposal.

Techniques	Characteristics of the initial web	Redesign proposal
Focus Group	The platform should improve the usability	Easy, intuitive, and simplified UI design
Survey	The architecture of information should be better, to optimize the findability of the contents	Site map proposed by the User-Centered Design
Method HUMULU Proto-persons	The users require simplification of the application process	Friendly and intuitive tool, with a notification system for job offers
User journey map	Difficulty finding service information	Simplify service information; the architecture of information of easy localization to the different services
	Information that does not correspond to the contracted service	Explanation of the contracted services
	Mandatory fields not identified	Identification of the mandatory text fields in the forms
	The non-confirmation of the data of the senior who will deliver the service	UI with confirmation data of the assigned senior
	The calls to action are not clear	Highlight and rank the calls to action.
Card sorting	Requires the application of the card sorting technique	Content distribution to ensure content findability
Benchmarking	Clarity of content organization	Quality of the contents
	Simple design and navigation	More user-friendly UI dashboard
	Responsive design	The UI will be accessible to multiple devices

information collected by the moodboard selected by the users, generating a more refined prototype: mockups. Subsequently, the prototypes are tested with the different groups of users, to verify the experience and find out if the proposal was coherent with the organization of the elements that were displayed and allowed an intuitive interface, with easy-to-find content and legible typography. The results of the applied tests are detailed below.

3.4. Testing Phase

The final prototype was subjected to a heuristic evaluation, a usability inspection method without users that consists of examining the quality of use of an interface by several expert evaluators, based on compliance with recognized usability criteria, called heuristic principles (Molich & Nielsen, 1990). The objective of this evaluation was to detect potential problems and solve them. Two UX experts participated in the evaluation and the results affected the prototype design stage: adjust icon size to improve readability, occupy the corporate color coherently, rank the information in terms of primary and secondary texts, incorporate breadcrumbs, and more intuitive information architecture.

To complement the heuristic evaluation technique, the usability test was applied. The objective of the usability test is to know in detail the ease of use of a product

or service and the level of effectiveness, efficiency, and satisfaction that it generates in the user. It was applied to 10 users (five clients and five older adults), through “lookback” software that allows testing versions of prototypes to know the tasks carried out and those not carried out by the users. A user interaction link with the prototype was sent, where they were asked to perform some tasks, which were performed with different levels of effectiveness.

The results of the usability test allow us to verify that there are opportunities for improvement, such as:

- On the home page, greater visibility to the range of services offered by the platform;
- Buttons at the top of the pages, without the need for them to be seen after the scroll or vertical displacement;
- Refine the information throughout the website so that it is not clear and precise.

Finally, the last test of the prototype, heat map, was applied, occupying the optimal workshop platform which corresponds to a graphic representation in which the matrix of a large mass of data is shown with colors that serve as informative elements to verify if the site is understandable to use since it identifies the elements that attract or not clicks. This test was carried out on 11 users of the customer profile, whose instruction consisted of

a simple order to the user to execute with one click, to perform three tasks: (a) request a service for the first time, (b) renew a service, and (c) login. The test was carried out at the following link: <https://cw4kvwi8.optimalworkshop.com/chalkmark/0j3r358p>. The synthesis of the results of the test of the heat map is detailed in Figure 6.

4. Discussions

The purpose of this study was to redesign a web portal, oriented towards communication and labor management for older adults, from the perspective of UX. The selected web portal was ServiSenior, a case study that contributed to this research due to: (a) its inclusive commitment, focused on the elderly population in Chile, and (b) its promotion of the development of flexible job opportunities for older adults offered online. In response to this, the application of UX tools for the redesign of this web portal allowed the process of adapting the existing one to the requirements and needs of the group of older adults. With the investigation, it was possible to verify that the UX methodology allows providing a pleasant experience through ease of use and access, to vulnerable social groups, especially the elderly, considering effective communication as a relevant factor in the main activity that older adults do in digital media (Nordin et al., 2022), achieving employability goals for this population through the ServiSenior website.

The UX model made it possible to define website design criteria, adapted to the characteristics and needs of people (Pretel-Jiménez et al., 2022), in response to the physical limitations of aging, as stated by Gopal and Murale (2018), Huang et al. (2017), Wildenbos et al. (2018), and the World Health Organization (2015). The redesign of this type of platform allows older adults to fully participate in the activities of society mediated by technology, which positively affects their physical and emotional well-being, improving their quality of life,

according to Dekker-van Weering et al. (2017), Portz et al. (2019), and Rojas et al. (2022). The application of this methodology provides a timely response to future research involving older adults, with a focus on the needs and timely solutions (Nordin et al., 2022).

The different techniques of the UX model yielded data that made it possible to define the redesign of ServiSenior (Table 3), based on relevant criteria for the development of communication and employability products focused on older adults, replicable for other vulnerable populations, such as people with disabilities, or the general public. Therefore, the UX methodology represents an ideal model to know in depth about the characteristics of particular populations, which allows for designing or redesigning technological solutions aimed at the efficient use of ICT, guaranteeing their successful integration into daily life.

5. Conclusions

In response to the fulfillment of the objective of this research, aimed at redesigning a web platform for employment and services (ServiSenior), defining design guidelines that provide inclusive UX for older adults, based on UX research techniques, the following conclusions are presented.

The UX methodology approach allowed the construction of research guidelines, testing, measurement of experiences, and the creation of a sequence of prototypes to iterate and redesign each stage of the website based on UCD.

The UX methodology allowed a broader and more global understanding of the project, aligning efforts in a coordinated manner and helping to define the product in the initial phases, which quickly expanded the transmission of knowledge to the work team, allowing to reduce the time.

The results of this research allowed the design of a prototype for the creation of an easy-to-use web

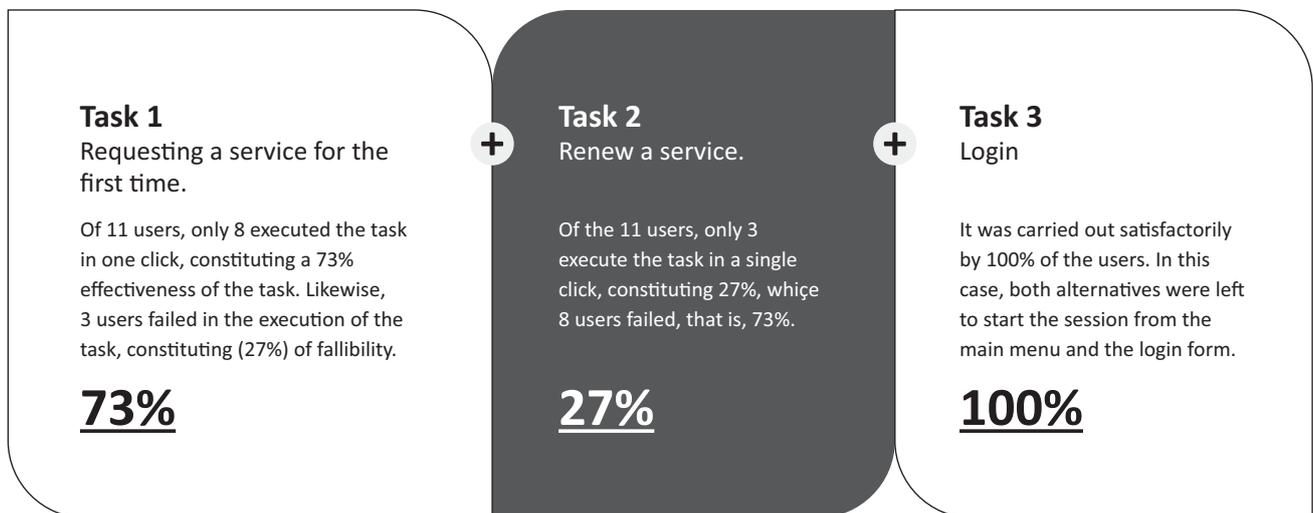


Figure 6. Results of the test of the heat map.

platform, focused on the elderly. The importance of involving users in the construction of the product was evidenced from the beginning of the creation of the digital project, which allowed (a) knowing the needs of the target audience, (b) knowing the different visions of the company's work team, (c) efficiency and optimization of design time, (d) iterating and refining the prototypes to generate better design results, and (e) establishing more accurate methods and processes for the creation of the design and development of inclusive digital products.

The UX methodology made it possible to mitigate the uncertainty of creating a design product without feasibility techniques from data collection and throughout the creative process. The relevance of the co-creation of the final product with the active participation of the target audience is highlighted, based on continuous testing in each phase from a measurable perspective for its refinement, improvement and effectiveness.

In attention to the prospective in future projects, it can be highlighted that the UX methodology proves the importance of involving users, due to several important aspects: (a1) Technology is changing as well as its languages; (b) users experience psychological, motor, and perception changes as the years progress; (c) there is always the opportunity to learn new technological alphabets; (d) the use and access to technology allows us to approach new realities and possibilities, both work and connection with people.

Regarding employment portals and their importance to universal access, it is proposed to promote research based on the UX methodology, which involves older adults and production and design units working as a team and developing products that serve to insert this vulnerable population in workplaces. This will help the design to be developed with greater criteria of universality and adaptability, strengthening the right of use and access of human beings to the use of digital technology.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

Age-Based Digital Divide: Uses of the Internet in People Over 54 Years Old

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Abstract

The digitization process is widespread and unrelenting. Compared with other European countries, Spain has a good position in the latest data compiled in the Digital Economy and Society Index. Direct use of communication and information technologies is high among the regions in Spain, where the national average in the region of Valencia stands out. However, despite this context, differences between population groups continue to be observed in different dimensions of the digital divide. This article explores this multidimensional gap among the midlife and older adult population. The research design adopts a mixed-method sequential design (questionnaire-based survey, follow-up with semi-structured interviews) to explore social positions in relation to access and use of technologies and the meanings that people ascribe to such positions and actions. A telephone survey was conducted with 1,800 people over 54 years of age residing in Valencia in September 2021, followed by 67 in-depth interviews. The results suggest that demographic and socioeconomic characteristics (level of education, age, and gender) determine people's position in the digital divide. Qualitative discourses qualify these results by elucidating key aspects that could be acting as protectors of digital and social exclusion. They are related to the social and family context and the characteristics of digital service providers. The findings are useful to guide both public policies to promote digital inclusion and private market actors when designing their digital strategies.

Keywords

digital competence; digital divide; grey divide; internet access; logistic regression; social context

Issue

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1. Introduction

New technologies and digitization are essential for current European societies and have a greater relevance since Covid-19 (European Commission, 2021). Spain is ranked seventh in the Digital Economy and Society Index, showing a growing progression since the pre-pandemic years and standing out in terms of digital connectivity and public services (European Commission, 2022). However, it must improve in businesses and human capital. The latter should include having a population with at least basic levels of digital skills (European Commission, 2019).

According to the National Statistics Institute in Spain, 95% of the population between 16 and 74 years of

age are internet users (Instituto Nacional de Estadística, [INE], 2022a), yet only 38% of the population have more than basic digital skills (European Commission, 2022). The survey from which these data are extracted follows the guidelines of the European Statistical Office (Eurostat), so this difference points to the existence of a digital divide, as a term that refers "to the distinction between those who have internet access and are able to make use of new services offered on the World Wide Web, and those who are excluded from these services" (European Statistical Office [Eurostat], 2019). This definition is complemented by other comments, among which the contributions of scholars of the second-level digital divide are recognized when they state that the

term “explicitly includes access to ICTs, as well as the related skills that are needed to take part in the information society” (Eurostat, 2019). Thus, since the beginning of this century, the specialized literature has been providing keys to understanding the processes by which digital divides are generated, identifying three levels of the divide that correspond to access, use, and utility (e.g., Hargittai, 2002; Ragnedda & Ruiu, 2017; Van-Deursen & Helsper, 2015a; Van-Deursen & Van-Dijk, 2019).

The first-level digital divide is produced by a lack of adequate facilities (Compaine, 2001; Organisation for Economic Co-operation and Development [OECD], 2021) but also by inequalities in access to technology and the internet caused by the difficulty of having the necessary and updated devices and programs. In fact, in countries with practically universal connection rates, first-level gaps caused by what Van-Deursen and Van-Dijk (2019) call “material access” continue to be detected, which “includes the means required to maintain the use of the internet over time, such as computer devices (e.g., desktops, tablets, Smart TVs), software (subscriptions), and peripheral equipment (e.g., printers, additional hard drives)” (Van-Deursen & Van-Dijk, 2019, p. 355).

Currently, some countries have access difficulties due to income, age, gender, and geography (OECD, 2021). Spain has a wide coverage of infrastructures, with 83% of homes having a fixed broadband internet connection (INE, 2022a), yet it has a worse score in the geographical criterion, with rural areas being below the European average (OECD, 2021). This information would support the relevance of focusing the analyses on specific areas, such as those administered by regional governments in Spain (the so-called *comunidades autónomas* or regions). Spain is a country whose territory is organized into a set of regions under its 1978 Constitution. A total of 17 communities are recognized, most formed by more than one province. The region of Valencia is located on the Mediterranean coast. With three provinces (Valencia, Alicante, and Castellón), this region is the eighth largest in terms of area. However, it also excels in tourism, industry (food, ceramics, chemicals, and technology), and agriculture (mainly citrus fruits). In fact, despite not being the largest, the Valencian Community contributes 9.4% to the national GDP, placing it fourth in terms of wealth generation (INE, 2020). It is also the fourth biggest region in the country, with over 5 million inhabitants. Its user population is similar to the average, but the divide is greater in recent generations (user population 75+ years: Spain = 36%, region Valencia = 27%; INE, 2022b).

Furthermore, the second-level digital divide refers to uses and skills (Hargittai, 2002; Van-Deursen & Van-Dijk, 2014). The information on the user population offers a first approach to access and use, even though at this level, observation of the activities is required. As a starting point, the main models derived from the Technology Acceptance Model introduce previous experience as a facilitating factor for use (Venkatesh & Bala, 2008) and the effects of sociodemographic characteristics

(Venkatesh et al., 2003). This would be in line with other studies on the digital divide. Regarding the second-level digital divide, the appropriation theory (Van-Dijk, 2012) presents a model that includes previous mechanisms that act in the integration of technologies in daily life, such as resources (economic, social, and cultural capital), motivation, and skills. Van-Dijk (2012) proposes several types of digital skills (operational, formal, information, communication, content creation, and strategic skills) whose observation has also involved several kinds of measurement. The process of appropriation culminates in the usage of technology. In this process, the effect of socioeconomic characteristics is also observed. As well as age, authors delve into socioeconomic position, employment situation, and completed education (Van-Deursen & Van-Dijk, 2014, 2015; Wei & Hindman, 2011; Zillien & Hargittai, 2009). Gender acts in an ambivalent way, with a weak or indirect association in some research focused on uses or skills (Hargittai, 2002; Van-Deursen & Van-Dijk, 2015) and significant in others that try to explain the use of the internet (Castaño et al., 2011; Garín-Muñoz et al., 2022; Haight et al., 2014; Wasserman & Richmond-Abbott, 2005; Zillien & Hargittai, 2009).

The third-level digital divide is associated with usefulness (Ragnedda & Ruiu, 2017) and is understood as the population’s ability to obtain a benefit in their lives by using ICTs (Calderón, 2021; Ragnedda, et al., 2022; Selwyn, 2004; Van-Deursen & Helsper, 2015b). Its consideration helps to understand the reproduction of social inequalities in the digital society (Helsper, 2021; Ragnedda, 2016). In operational terms, the Dutch study by Van-Deursen and Helsper (2015b) approaches this third-level divide by identifying a set of internet outcomes linked to five categories of uses, which reflect different types of benefits.

From this point of view, the aforementioned digital skills would act both in the second and third-level divide when dealing with knowledge and skills that transcend the mere concept of skill (Recomendación del consejo de 22 de mayo de 2018, 2018) to become instruments to correct social exclusion (European Court of Auditors, 2021). The DigComp model groups them into five domains according to the type of use. This framework also guides the Spanish proposal and that of the region of Valencia (Generalitat Valenciana [GVA], 2021a; Government of Spain, 2021; Vuorikari et al., 2022), although in Europe the Eurostat indicator (Eurostat, 2021) is used, which is based on a list of uses associated with four areas according to their nature: information, communication, problem-solving, and management of computer programs.

Age is a relevant variable at the different levels of the digital divide, especially when comparing middle-aged and older adults with other groups (Battersby et al., 2016; Fang et al., 2019). The recurring observation of the existence of such distances by age (Haight et al., 2014; Shultz et al., 2015; Van-Deursen & Helsper, 2015a; Van-Deursen & Van-Dijk, 2011; Van-Dijk, 2012) supports

the construction of the concept “grey digital divide” (Friemel, 2016; Morris & Brading, 2007) to refer to what occurs in older people when compared to young people. Age, on the other hand, is shown to be a determinant for the access and use of technologies, but not in a linear way (Fang et al., 2019), which would lead to it being taken into consideration as a first approach to the generational perspective applied to the processes of technological disruption, whose genesis should be sought in the concept “generation” of Mannheim’s sociology (Leccardi & Feixa, 2011). The article also focuses on digital (Prensky, 2001) and technological generations (Loos & Ivan, 2022), endowing the observation of the age groups of these cohorts with meaning.

Studies focused on the last generations by detecting other factors that explain the differential exposure to technology, such as: completed education, income, or social resources, show the existence of heterogeneity among older adults (González-Oñate et al., 2015; Hargittai et al., 2019; Tirado-Morueta et al., 2018; Van-Deursen & Helsper, 2015a). Education stands out among them, being the main sociodemographic variable that predicts internet access and usage. However, it is important to note that this variable is related to others, such as income, and interacts, in turn, with age and gender (Fang et al., 2019). In contrast, many studies do not find differences by gender in internet access, although the differences found are located in the distribution of activities according to gender analysis (Cresci et al., 2010; Papi-Gálvez & Escandell-Poveda, 2019). Other studies have emphasized the influence of the social or family context (the latter is due to the presence of other generations) that may favor internet access and use (Abad-Alcalá, 2014; Huxhold et al., 2020; Llorente-Barroso et al., 2015; Llorente-Barroso, Kolotouchkina, et al., 2023; Rosales & Blanche-T, 2022).

This previous research confirms the multifactorial character of the generational digital divide. In this respect, along with the study of sociodemographic characteristics and other psychosocial or health factors (e.g., Llorente-Barroso, Anzanello-Carrascoza, et al., 2023; Peral-Peral et al., 2015; Urbina et al., 2022) in recent years, analyses have emerged that delve into the combined effect of different variables, to identify population profiles. From these proposals, for example, it can be seen that a large group of people over 60 years of age in Europe are consumers of traditional media, although there are also innovative users (Nimrod, 2017). In another study, they distinguish up to five categories of users over 65 years of age according to, among other variables, their stance on privacy (Elueze & Quan-Haase, 2018). In Spain, Llorente-Barroso, Sánchez-Valle, et al. (2023) propose a taxonomy composed of seven groups of people over 60 years of age, based on the use of new technologies, e-commerce, and public administration, which demonstrates both the intragroup heterogeneity and the increasing potential of such age groups as a target audience, with growing relevance given the

aging population. In fact, in Spain, both groups of adults aged between 55 and 74 and those over 74 will increase by 3% in eight years. At the end of Europe’s Digital Decade (European Commission, 2021) in 2030, they will represent 27% and 11%, respectively, of the population over 15 years of age (INE, 2022b). Identifying the main factors that act in digital divides can provide information to adopt prioritized actions in groups at risk of social exclusion.

This research aims to explore the phenomenon of the digital divide by age in the Valencian community. This is the Spanish region’s first representative study at the provincial level. This article aims to describe the digital divide’s effects on the population over 54 years of age (generational digital divide), gender, completed education, and rurality. The study also aims to explore the perception of the internet and other key factors of their social and family environment, considering other middle-aged groups.

In this regard, based on previous research into the Valencian community, it is also assumed that the older the person is, the lower the access and level of digital skills due to a generational effect (a population that during their education and work years did not have contact with the digital world and, therefore, has had less experience). It is understood that gender can be an important differentiating factor given that these are generations (people born in the 1960s or earlier) where educational, employment, and economic opportunities and, in general—gender roles crafted a much more favorable situation for men than for women. On the other hand, it is understood that, as access to information technologies entails putting into practice the skills developed during school years, completed education can show the difference in access and skills. The type of surroundings in which the population lives (rural or urban) can influence the availability of information technology resources. Finally, the presence of other younger generations is also a key element in older people’s access to and use of technology.

2. Material and Method

2.1. Design

This study involved an exploratory cross-sectional study with primary sources combining quantitative and qualitative techniques sequentially. Quantitative data was collected through the telephone survey technique aimed at people over 54 years of age residing in the region of Valencia. A maximum age limit was not established; therefore, this variable finally oscillated between 55 and 94 years of age ($\bar{x} = 68$, $SD = 9$). This survey was conducted to answer the objectives of this study.

Regarding the qualitative approach, semi-structured interviews were applied by telephone with people over 39 years of age from the same geographical area. These interviews were conducted with people other than those

who responded to the survey. The ages were extended with respect to the quantitative by trying to detect key intergenerational aspects to contextualize the survey data. The information provided by this data collection technique served both to verify and understand the quantitative results.

The field research was conducted during September and the first week of October 2021. The survey began in the first week of September and ended in the third week of that month. The interviews began in September and ended in October. The fieldwork for the study was carried out by a company specialized in social research, which randomly contacted mobile and landline telephones through its own means.

2.2. Size of the Universe, Sampling, and Profile of Interviewees

According to the Municipal Register of Inhabitants, in the Valencia region, the population over 55 years of age stands at 1,653,910, (GVA, 2021b).

In order to have enough cases to be able to conclude results at the provincial level in the three provinces of the region of Valencia (Alicante, Castellón, and Valencia), a sample size of 1,800 interviews was established; 600 per province, following a stratified random sampling in each. The sample has a proportional distribution of the population according to the main variables to guarantee representativeness: sex (men, women), age (55–64, 65–74, and over 74), and municipality size (<10,000, 10,000–20,000, 20,000–50,000, 50,000–100,000, >100,000 inhabitants). With a confidence level of 95.5% (2σ) and maximum uncertainty ($p = q = 50$), this size provides an error for global data of $\pm 2.35\%$. Due to the non-proportional allocation according to province, the data was weighted for the global estimates. The company in charge of the fieldwork committed to delivering the data matrix with all the cases requested, according to the sampling provided by the researchers. The distribution of the sample by the main variables of this study is shown in Table 2.

With a qualitative approach, 67 telephone interviews were conducted with people aged over 39 in the region of Valencia. The selection and collection of the qualitative sample were equally random, with quotas for sex, age (40–54, 54–74, and over 74 years), and province (Alicante, Castellón, and Valencia). Finally, the number of interviews by sex and age is shown in Table 1. The same age groupings as in the quantitative study are used to facilitate its analysis, with the addition of the young-

est age group. The interviews were also transcribed for analysis by the social research firm that conducted the fieldwork.

2.3. Information Collection Instruments: Questionnaire and Interview Script

The questionnaire consisted of 26 questions grouped into five themes (including questions on access and skills) and a section that collected sociodemographic information, such as age, sex (self-identification), province, municipality, and completed education, among others. The expected duration to complete the questionnaire was 10 minutes.

The interview script consisted of five sections, plus an initial section with questions related to the established demographic criteria (sex, age, and place of residence), and the final one included a biographical framework. The main areas of focus of the interviews were: access to the internet (possibility of individual access, use, and frequency of use), approach to the internet (approach and use of internet in their lives, user-friendliness), perception of skills, and digital divide according to age. The average interview time was 17 minutes.

2.4. Analysis and Variables

Five logistic regression models were used to observe the relationship between the studied sociodemographic variables (sex, age, education, and municipality size) and the probability of having internet access or not, as well as the probability of being at the basic or “above basic” level in four types of skill (information use, communication, problem-solving, and management of computer programs).

The models include all four study variables in the form of categorical variables, using as reference values men, people between 55 and 64 years of age, people with tertiary education (university), and municipalities with more than 100,000 inhabitants, which gives the models a descriptive value, in other words, an informative value about which variables maintain a statistically significant association with the variables resulting from each model, rather than a predictive or classificatory value. The corresponding odds ratio (OR) and 95% confidence interval are estimated for each category using the weighted data sample.

The variable regarding internet access at home is derived from a question with a dichotomous response

Table 1. Interviews by sex and age groups.

	40–54	55–74			Total
		55–64	65–74	75+	
Men	11	9	4	10	34
Women	13	10	3	7	33
Total	24	19	7	17	67

included in the questionnaire: Do you have a home with internet access via any fixed or mobile device?

The different items on digital skills were extracted from the survey questionnaire on equipment and the use of information and communication technologies in homes (INE, 2020) to build the digital skills indicator used by the European Statistical Office (Eurostat, 2021). As an example, the cases in which a person knows how to copy or move files and search for information with a browser (information) are considered to be of a higher level rather than basic, also including making video calls and sending an email (communication), installing an application and online shopping (problem-solving), and using a word processor (management of computer programs).

In order to analyze the qualitative interviews, we proceeded to identify the responses generated around key topics of the quantitative part, specifically: internet access and use, and activities related to the observed domains. We also identified situations expressed within them that provided information on the social context (for instance, family support, perceptions, access to services, etc.) related to accessing information technologies. From an exploratory approach, a literal descriptive analysis of the text was carried out, comparing the age and sex of the interviewee. Therefore, fragments from the verbatim anonymized transcriptions are displayed.

3. Results

3.1. Sample Distribution

According to the interview, 84% of the interviewees stated they had access to the internet at home ($n = 1,514$), and 72% confirmed they had used it in the last three months, which corresponds with the user population ($n = 1,299$). Usage information to measure skills is extracted from the user population. Therefore, according to informative skills, 61% of the population has basic or higher than basic skills; 67% carry out communication activities; 71% responded that they had some use associated with problem-solving; and 58% confirmed they were able to perform tasks related to the management of programs. The distribution of populations and studied variables are included in Table 2.

3.2. Internet Access at Home

Internet access at home in the logistic regression models is associated with two fundamental variables: the age of the interviewee and completed education (Table 3). Both show an association in the form of a gradient: The older the person, the greater the probability of not having internet access at home, observing an OR of 3.96

Table 2. Distribution of the population of used variables in the models.

	Full sample ($n = 1,800$)			Questions addressed to the user group ($n = 1,299$)							
	Total ^a	Internet access ^a		Information ^b		Communication ^c		Problem-solving ^d		Software ^e	
		No	Yes	Basic	Higher	Basic	Higher	Basic	Higher	Basic	Higher
Sex											
Men	46%	6%	40%	9%	40%	11%	37%	17%	32%	30%	21%
Women	54%	9%	45%	11%	40%	9%	43%	21%	30%	31%	19%
	100%		100%		100%		100%		100%		100%
Age											
55–64	41%	1%	40%	8%	46%	6%	48%	17%	36%	35%	20%
65–74	31%	3%	28%	7%	26%	9%	24%	13%	21%	19%	12%
75+	28%	12%	16%	5%	8%	5%	8%	7%	6%	7%	7%
	100%		100%		100%		100%		100%		100%
Education											
University	13%	0%	13%	1%	19%	2%	17%	4%	15%	17%	6%
Secondary	54%	3%	51%	13%	50%	13%	51%	25%	39%	35%	26%
Primary or less	33%	13%	20%	6%	11%	6%	12%	9%	8%	9%	7%
	100%		100%		100%		100%		100%		100%
Municipality size											
>100,000	31%	5%	26%	7%	23%	6%	25%	12%	19%	22%	10%
50,000–100,000	15%	2%	12%	2%	13%	2%	13%	6%	9%	7%	7%
20,000–50,000	26%	4%	22%	5%	21%	6%	21%	10%	16%	17%	10%
10,000–20,000	10%	2%	8%	2%	7%	2%	7%	4%	6%	5%	3%
<10,000	18%	3%	16%	3%	16%	4%	14%	7%	12%	10%	9%
	100%		100%		100%		100%		100%		100%

Notes: ^a n total = 1,800; ^b n with informative skills = 1,216 (100%); ^c n communication = 1,211 (100%); ^d n problem solving = 1,283 (100%); ^e n software or management of programs = 1,050 (100%).

Table 3. Odds ratio of the five binary regression models.

Explanatory variables	Internet access (No)	Basic information skills	Basic communication skills	Basic problem-solving skills	Basic software skills (for content manipulation)
Sex					
Men	—	—	—	—	—
Women	0.994	1.213	0.593**	1.269*	0.889
Age					
55–64	—	—	—	—	—
65–74	3.962**	1.286	2.782**	1.194	1.096
75+	20.944**	3.241**	4.833**	2.272**	1.655*
Education					
University	—	—	—	—	—
Secondary	7.558**	9.703**	2.761**	2.493**	1.893**
Primary or less	42.314**	15.978**	4.108**	3.765**	1.890*
Municipality size					
>100,000	—	—	—	—	—
50,000–100,000	1.001	0.522*	0.510*	1.092	1.882**
20,000–50,000	1.011	0.738	1.169	0.963	1.229
10,000–20,000	1.059	0.767	1.062	1.093	1.182
<10,000	0.929	0.560*	1.145	0.969	1.793**
Constant	0.002**	0.026**	0.065**	0.194**	0.287**
Nagelk. R2	0.455	0.158	0.159	0.082	0.051

Note: * $p < 0.05$, ** $p < 0.01$.

(CI 95% = 2.05; 7.64) in people between 65 to 74 and of 20.94 (CI 95% = 11.27; 38.92) in people 75 and over. This gradient is even stronger among people who have completed fewer years of education, with an OR of 7.55 (CI 95% = 1.47; 38.71) among people with secondary education and an OR of 42.31 (CI 95% = 8.38; 213.47) among people with primary or no education. However, the other two variables in the model (sex of respondents and municipality size) do not show significant results.

3.3. Skills in the Use of the Internet and Information Technologies

Regarding the skills related to the use of information, no differences are observed between men and women, while there are significant differences according to the level of education (Table 3). People with secondary education show an OR of 9.70 (CI 95% = 4.39; 21.43), and those without an education or with only primary education reach an OR of 15.97 (CI 95% = 6.97; 36.61). Differences are observed according to age, but only for those aged 75 years or over (OR 3.24 CI 95% = 2.13, 4.92). At the same time, there is no clear pattern regarding municipality size, as only municipalities with 50,000 to 100,000 inhabitants and those with less than 10,000 inhabitants have an OR less than 1 that is statistically significant; therefore, the inhabitants from these towns have a higher probability of having basic skills in this sense than those living in cities with over 100,000 inhabitants.

In relation to communication skills, differences are perceived according to the sex of the user group. Women users are less likely to have basic skills than men (OR = 0.59, CI 95% = 0.43; 0.80), so they are above the basic level. The interpretation is the same in municipalities with 50,000 to 100,000 inhabitants compared to those with over 100,000 inhabitants (OR = 0.51, CI 95% = 0.30; 0.86). Similarly, there is a gradient according to age (people from 65 to 74 years with OR = 2.78, CI 95% = 1.98; 3.90 compared to those over 75 with OR = 4.83, CI 95% = 3.18; 7.33) and according to completed education, with an OR of 2.76 (CI 95% = 1.65; 4.59) for people with secondary education, those without an education or with primary education; an OR of 4.10 (CI 95% = 2.32; 7.24).

The model on skills related to problem-solving shows an association in the opposite direction to that described in the previous model regarding sex, with it being more frequent for women than men to have this skill at a basic level with an OR of 1.26 (CI 95% = 1; 1.60). As in the previous model, there is an effect by age only for those over 75 years of age with an OR of 2.27 (CI 95% = 1.58; 3.25) and a gradient according to the level of education: OR of 2.49 (CI 95% = 1.75; 3.53) for people with secondary education and OR of 3.76 (CI 95% = 2.47; 5.73) for people with primary or no education. There are no significant results for the case of municipality size.

Finally, the model related to the skills in managing computer programs does not show differences

concerning gender, although there are slight differences according to age (for those over 75, the OR = 1.65, CI 95% = 1.05; 2.59). These values are almost identical for people with secondary education and those with primary or no education: OR of 1.89 (CI 95% = 1.28; 2.78) and OR of 1.89 (CI 95% = 1.13; 3.13). Regarding municipality size, there is a higher probability of having basic levels in this skill (software skills) in municipalities with 50,000 to 100,000 inhabitants (OR = 1.88, CI 95% = 1.16; 3.03) and those with less than 10,000 inhabitants (OR = 1.79 CI 95% = 1.15; 2.77).

3.4. Qualitative Interviews

With regard to the key issues addressed in the quantitative part, the possibilities of accessing and using the internet are observed. Among the interviewees with internet access, living in urban areas is mentioned as one of the determining factors for having a quality service. Quality decreases in rural areas and outside the home. As some interviewees indicate, “Well, sometimes it [the internet] doesn’t work. I live in the countryside, and there’s not much signal” (woman, 55–64 years of age); “the internet connection on my phone is awful so I hardly connect to it outside my house” (man, 75+). The younger groups convey a more critical approach to the quality of service: “Well, it could be improved on some occasions, especially in certain areas. Because ours is a rural area, but even in a rural area, as there are already houses, they should improve it a little more” (woman, 40–55). As a consequence, internet-related activities are carried out, in these cases, at home, although the older group does not consider it essential to have this connection outside the home, showing less technology adoption in their daily lives: “Outside the home, I don’t use it; I don’t see it useful” (man, 75+). This connection outside the home is made through cell phone data, a device commonly used by all interviewees outside the home. On the other hand, the interviewees with a higher knowledge manage to not depend on where they connect: “I don’t have normal internet, I use my phone with my laptop” (man, 65–74).

Closely related to the location of internet access, the interviews also report on dynamics of use that go beyond the individual scope and involve the whole family. Among the eldest in the group, some stated that they had internet access installed for their family to use, which would also confirm the relationship between access and the presence of younger generations in their immediate surroundings. The perception of service suitability will depend, in these cases, on the opinion of their children or grandchildren: “Yes, I have a mobile, tablet, and computer, but I don’t really use them; I have them for when my grandchildren come” (woman, 75+), “[if you have internet access at home] Well, yes, but that’s my children’s thing, I have things that they plug, some of them I don’t even know” (man, 75+).

The relationship with the family also confers a sense of the internet being useful, which is closely linked to

the possibility and variety of uses of the technology. Although the older ones also mention activities related to information and entertainment carried out over the internet (for instance: “If you check trips or trains or anything else, well you have it straight away....It’s a really efficient and quick tool” [man, 75+]), the instant messaging is sometimes only used to keep in touch with family: “Well I think it’s really useful, as I say, I live alone and when I speak to my grandchildren who live abroad, well for me it’s amazing to see them on my phone” (woman, 75+), “I use it to talk to my children, to my grandchildren....To talk to other people in an affectionate way” (man, 65–74). In fact, the mobile is the key access device among the older interviewees. For younger people, paid work is a necessity that requires the use of both cell phones and computers.

Regarding the concept of the internet, it seems to be associated with its contexts, which favor certain uses, and with people’s perception of their skills. In fact, having had previous experience with ICTs, for example, through paid work, influences people’s perception of their own abilities. This has a main role in people’s internet use and, specifically, being confident in the face of perceived inconveniences, such as the possibility of scams. Those who are most negative about it consider that the internet is useless in their lives and that they should not be obliged to use it for economic or administrative formalities.

In all cases, when necessary, family is the main source of help. “I don’t find it difficult because it’s something I use every day....Maybe when I have to do other things like move folders, I find it more difficult....So I ask my daughter when I don’t know how to do something” (woman, 75+). However, the context must be favorable: “So, if they [children and grandchildren] were here all the time, well maybe I would dare to use the internet a bit. But you hear so many bad things about it” (man, 55–64). In this sense, the younger people usually help family members: “My father-in-law, my parents...people over 70, obviously they need to use the Health Department app or any other app, and it’s difficult for them, so they ask me” (man, 40–54). Interviews with the younger generation show the relevance of the family when parents need help.

In short, in order to understand the diversity among older adults, as well as service quality, previous experience, and training, other key aspects emerge, such as the presence of other generations.

4. Discussion and Conclusion

The results obtained confirm a generational divide concerning access and skills related to information technologies. However, the most decisive aspect is completed education, both due to the size of the effect and because the gradient was found for all the categories studied in all the models, as other authors affirm (e.g., Fang et al., 2019). Indeed, the gradient was found to such an extent that, for gender, significant results are hardly found; when they

are, they are ambivalent according to the value of the Odds Ratio, in which it can be seen that this variable acts in two competency dimensions but in the opposite direction by sex (women would more frequently have above basic skills in communication and men in problem-solving). There are, nonetheless, differences according to the municipality size in the explored models.

This information points to the fact that a generational divide is relevant to analyze inequality in accessing information technologies. However, as other studies show (e.g., Tirado-Morueta et al., 2018), when age groups are observed, it is not the most significant factor in these groups—education is more relevant. This has implications for the design of public policies, as the support aimed at certain age segments would be insufficient (by excluding younger people with the same or greater problems due to their education) and also because they indicate a situation that would not be corrected with generation substitution.

The practical absence of differences according to gender is counter-intuitive given the significant gender gap in areas such as paid employment, level of education, purchasing power, carrying out housework, and presence in public spaces, especially for people born before the 1960s. The only aspects in which significant differences are observed (communication skills in favor of women and problem-solving in favor of men) can be interpreted based on traditional gender roles, such as the greater role of communicating with family in women, linked to care, which is in line with other research that addresses the family context (Huxhold et al., 2020; Rosales & Blanche-T., 2022). In the same way, men may be trying to conform to role expectations. In fact, it is common for men to consider that their role is problem-solving in opinion polls. Nonetheless, the relevant fact is that these results are exceptional and show reduced effects, as other studies point out (e.g., Van-Deursen & Van-Dijk, 2015). Therefore, the hypothesis of the digital divide regarding gender should be reviewed so that regarding the level of education and age, men and women have very similar capacities with respect to information technology skills.

Finally, the practical absence of significant results on environment size dilutes the hypothesis about the effect of rurality on the digital divide. This result could be specific for the studied population, i.e., the region of Valencia, a Spanish region characterized by its high demographic density, significant industrial-economic development, good communication, and information infrastructures, and important levels of urban continuity amongst different-sized municipalities. There could also be a statistical artifact problem as, precisely for these reasons, the size of the municipality does not adequately describe the degree of rurality, the distance, or the absence of basic services in the area, as it is perceived as a relevant factor in the interviews.

Other limitations in the study design refer to the simplicity of the models used for the analysis, as the

most complete multivariable models are desirable that include variables related to income level (although these pose measurement problems when they are not related to family budget surveys specifically designed for this purpose); the type of work activity carried out (that requires a high coding effort and extensive sample bases); gender roles (household chores, care, social support, family integration, etc.); and attitudes, among others, as other regression studies (e.g., Van-Deursen & Van-Dijk, 2019) or population profiling studies have further explored (e.g., Llorente-Barros, Sánchez-Valle, et al., 2023; Quan-Haase et al., 2018).

Likewise, regarding studying generational phenomena, it is advisable to develop surveys with a longitudinal methodology or, at least, periodic surveys that make it possible to distinguish between generational (or cohort) effects, life cycle effects (age itself), and time-related effects (cyclical elements such as confinement may have stimulated the skills studied). In any case, the methodology used makes it possible to relate the generational hypothesis to the formative one and significantly clarifies the hypotheses related to gender and rurality.

Among the potentialities of this study, the type of survey is outlined, as it uses a practically universal channel, the telephone, as opposed to the increasingly common approach of using online surveys that would be disregarded in this case. In the same sense, the sampling strategy guarantees a broad level of randomization in the sample, reinforced by the use of quotas for age, sex, and municipality size for each of the provinces studied. This process reduces the possible risk of having sample selection biases. Thus, the findings provide sufficient information to know the effect of basic sociodemographic characteristics on the digital divides of the elderly Valencian population. The qualitative approach addresses other aspects to delve into understanding the situation of this group of older adults, particularly those perceived as lacking in skills, such as the effect of the presence of other generations on the data on internet access and use provided by the surveys.

To conclude, the results of this analysis indicate that within the generational digital divide that dominates the public discourse, there is a significant digital divide due to educational reasons that are much less explicit in the discourses and that has marked the transgenerational component (people with few educational resources in different age groups). Nonetheless, the generational effect is mainly observed in people over 75 years of age; therefore, other factors related to the possible loss of autonomy due to aging should be considered (the life cycle effect, more than generational). Public policies should consider training-related barriers so as to guarantee equal access to the digital world. In addition to training strategies, advances are needed in regulating the digital space to promote the design of applications and services that are easily accessible and which protect the user population.

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Conflict of Interests

The authors declared no conflicts of interest.

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Article

Assessing Older Adults’ Perspectives on Digital Game-Related Strategies to Foster Active and Healthy Ageing

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Abstract

The growing use of digital platforms among older adults has brought increased challenges to the design and development process, thus requiring considering age-related needs and changes. Nonetheless, a growing body of research suggests that different types of applications of digital platforms, i.e., digital games, can foster new opportunities to encourage active and healthy ageing (AHA) by promoting knowledge acquisition, developing competences, fostering well-being, and deepening social connections. Therefore, this study aims to assess older adults’ perspectives and participation in digital game-related strategies and how these can foster AHA. A mixed-methods approach was applied, resorting to field notes and a questionnaire, involving 18 participants aged between 63 and 81, at the Ageing Lab (Laboratório do Envelhecimento). Through 10 exploratory digital gaming-related sessions over approximately two months, participants were introduced to game-related strategies and online communities. Overall, this study sustained previous research about the influence of digital games and online communities in the promotion of AHA, by encouraging participation in society, acquisition of new digital competences in the dimensions of information and data literacy, communication and collaboration, and safety; and maintaining one’s health and well-being. Moreover, findings suggest that continued contact with information and communication technologies stimulates digital proficiency, thus further fostering inclusion in an increasingly digital society.

Keywords

active and healthy ageing; digital competences; digital games; miOne; older adults; online community

Issue

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1. Introduction

Information and Communication Technologies (ICT) are essential for disseminating research information and promoting its shareability and socialization. Indeed, ICT can facilitate different generations with information consumption and daily activities, and older age cohorts are no exception. For example, older adults may benefit from learning new competences, cognitive development (Llorente-Barroso et al., 2022; Quan-Haase et al., 2018), and increasing possibilities of keeping in touch with family and friends, including their social relationships using ICT (Urbina et al., 2022)—thus mitigating

the negative effects of social isolation (Llorente-Barroso et al., 2021), and promoting active and healthy ageing (AHA; Bousquet et al., 2015).

According to Köttl and Mannheim (2021), the age definition of an older adult when considering the relationship with digital technology varies between 50+ and 70+. The WHO (2015) considers 60 to be the minimum age for this classification, whereas other researchers (e.g., Koivisto & Malik, 2021; Nimrod, 2014; Sharma et al., 2021) refer to older adults as people aged 55 and older. It should be noted that at the age of 50, some of the age-related impairments may start to emerge (Landi et al., 2017; Sengoku, 2020).

Nonetheless, the enormous heterogeneity of older adults and context are often overlooked (Köttl & Mannheim, 2021). Whereas younger older adults (50+) are already starting to use digital technology and close the age gap, older ones (70+) show high percentages of use combined with a great willingness to sustain this behaviour (Kakulla, 2020). Therefore, developing inclusive digital platforms is crucial.

Digital inclusion emerges as a way of mitigating the disparities between those who master ICT (i.e., digital literacy) and those who do not, as happens with a significant part of older adults (Han & Nam, 2021; Reneland-Forsman, 2018). This concept requires equal opportunities for learning about digital technology, not just in terms of skills and qualifications, but also understanding its significance and purpose. In fact, the wide availability and access to digital media do not guarantee an increase in use per se (Loos & Ivan, 2022)—their learning must be guaranteed. This new info-communication period characterized by interconnections, flows, and networks (Castells, 2004), highlights that digital inclusion or exclusion in the social appropriation of ICT tends to affect the emancipation of individuals, social inclusion, and informational competences for learning.

In a digital society, ageing audiences are doubly excluded in terms of access and appropriation. They are often associated with the inability to adapt to new contexts and learning; however, the design of digital artefacts tends to be neither accessible nor suitable for older adults (Zheng et al., 2013). Learning to use the computer and/or the internet is a cognitive competence (Le Deist & Winterton, 2005) and can present further challenges when dealing with age-related cognitive impairments (Steinberg et al., 2013). Nevertheless, older adults having difficulties does not make their educational process unfeasible and it is not a condition for digital exclusion. By encouraging them to use ICT, their cognitive skills, autonomy, involvement in interpersonal relationships, and performance of daily tasks can be stimulated (Zheng et al., 2013), preferably through guided and modular learning (Schlomann et al., 2022).

In the same vein, digital games can foster one's mental capacities, which can make it beneficial to promote older adults' AHA, and in the prevention and treatment of diseases (Rose et al., 2015). In fact, playing digital games may present a way for older adults to increase social connectedness by sustaining networks to current social ties and assisting novel social interactions with online communities (Sauvé et al., 2017; Schell et al., 2015). Specifically, this article gives insights into how game-related sessions (i.e., the use of digital games as a primary instructional tool) can foster AHA and older adults' digital competences (as an integral and consequent part of the cognitive stimulation and well-being).

In the context of this research, a series of 10 exploratory game-related sessions are designed to provide an engaging and immersive learning experience that

leverages the motivational and interactive features of games to promote learning and competence development. The researchers recruited a sample of 18 older adults to engage with digital technologies in a computer-based setting—in particular, digital games and online communities. It is expected to have additional knowledge for conceptualizing, designing, and implementing digital games in senior online communities. To do so, a thematic analysis was performed, based on a narrative synthesis, resulting in three major themes to be explored: (1) digital knowledge and competences, (2) player versus player versus bots, and (3) technological peripherals: helpful or a threat?

2. Older Adults in a Digital Society

2.1. Digital Games in Late Adulthood

Playing can be an approach to support older adults to deal with and engage with new digital ICT (Oppl & Stary, 2020). Beyond being an incentive for older adults' participation in exercising, it may also offer therapeutic effects—i.e., older adults start demonstrating changes in behaviour, satisfaction, and interaction, which may provide physical (González-Bernal et al., 2021) and psychological well-being (Rienzo & Cubillos, 2020)—by using technology-assisted learning (Llorente-Barroso et al., 2022), as well as improvement in autonomy (Jahouh et al., 2021).

Digital games are often regarded as attractive and interactive environments that capture players' attention and motivate them by offering challenges that require increasing levels of dexterity and skills (Isbister, 2017). Numerous benefits are potentially brought by digital games, such as motivation for using ICT—e.g., to engage in new gaming and learning activities (Zelinski & Reyes, 2009), and practice healthy behaviours for increased well-being (Ijsselsteijn et al., 2007)—ease of learning, development of cognitive competences, stimulation of discovery, the opportunity for experiences, stimulation of socialization—when players are working in teams (i.e., cooperation), or even during the battle between players (i.e., competition)—promotion of motor skills, concentration and reasoning, stimulation of the development of representation and visual attention, critical thinking, and observation (Loos, 2017). In fact, digital games are able to cope with some of the effects of ageing, and to improve the cognitive competences (e.g., memory) of older adults (Damayanti & Ali, 2022; Schell & Kaufman, 2016; Udeozor et al., 2023).

Moreover, digital games tend to assume therapeutic purposes (e.g., cognitive, physical, psychological, and emotional), helping to alleviate pain and providing a sense of well-being, pleasure, and productivity (Allaire et al., 2013)—i.e., it contributes to AHA. Nonetheless, Xu et al. (2020) point out the need for further research on the impact of digital games on social inclusion, interaction, and health in older adults, despite the

existing evidence of their potential for active learning experiences and establishing connections between rules, reward systems, and good practices.

Furthermore, a model for attributing meaning to the game by older adults must present a purpose/value, cultural or educational benefits (e.g., promotion of personal growth and learning), and contribution to society (Nimrod, 2011). Considering that wisdom and experience are part of integrity—according to Erikson’s psychosocial development—in adulthood (Malone et al., 2016), digital games should promote activities that reinforce integrity while fostering themes of memory, narrative, and sharing of experiences to allow a retrospection of the lived past.

Games tend to reflect a player’s identity since these promote the transition to the outside world and confer expectations of social relations to the virtual scenario (Salen & Zimmerman, 2010), giving rise to senior online communities. Online communities in a game environment have the potential for (Moffatt et al., 2016; Preece, 2000): (a) uniting geographically distributed groups; (b) minimizing the effects of social isolation; (c) establishing relationships in multiplayer games with family and friends; (d) building learning networks; and (e) enhancing the value of social life, identity, and cultural heritage (e.g., language, traditions).

In this context, using digital games in a community can promote and contribute to a better quality of life and well-being. At the same time, the fact that older adults can play with/against other people introduces the aspect of socialization and increases their interpersonal relationships. New relationships can be formed through playing digital games, often perceived by players as a social gathering in an online social environment (Domahidi et al., 2018). The interactions and shared experiences in digital games can create a sense of connection with the community and nurture informational and emotional interactions that promote social connectedness.

2.2. Bridging Senior Online Communities and Digital Games

The evolution of media communication is visible through the creation of online communities, intending to constitute spontaneous social events in electronic networks around common interests, leading to the construction of a complex network of interpersonal relationships. Older adults’ digital participation has the potential to minimize social exclusion by reducing loneliness and depression (Koss et al., 2014; Nedeljko et al., 2021). Social connectedness has been defined as the relationship between the self and society, as described by Lee et al. (2001, p. 310):

People with high connectedness tend to feel very close with other people, easily identify with others, perceive others as friendly and approachable, and participate in social groups and activities....People

with low connectedness tend to feel interpersonally distant from other people and from the world at large.

Additionally, the main motivations of individuals aged over 50 for the use of online social communities are (Kamalpour et al., 2020; Pan, 2018; Vosner et al., 2016): (a) feeling pleasure; (b) interacting with other people and reducing of loneliness; and (c) receiving social support, which consequently reduces anxiety.

When combining senior online communities with digital games, a new hybrid medium emerges (i.e., social digital games). According to Juul (2010), it can be defined as a game where social connections have an additional dimension, by enabling an understanding of other players’ goals, prioritizing social interactions, and sharing a common intentionality that gives a new social meaning to actions. In addition to complementarily sharing all the benefits of the media that are at its origin and being able to promote AHA—by deeply strengthening social ties, fostering participation, and promoting one’s well-being—multiple studies (e.g., Lin & Chuang, 2019; Wang et al., 2011) have shown that competence acquisition is something that can be highly stimulated in these contexts.

3. Context and Methodology

This research study was developed and conducted with the main purpose of engaging older adults and assessing their perspectives on the multiple media assumed by ICT—specifically, digital game-related strategies, and senior online communities to foster AHA. It occurred between 3 October 2022 and 5 December 2022, over 10 exploratory digital game-related sessions, at the Ageing Lab (Laboratório do Envelhecimento).

A mixed methods approach was followed, enabling us to explore more complex phenomena in detail. This approach allows for an in-depth exploration of findings, starting from qualitative information that is complemented by quantitative data. The following sections describe a demographic characterization of the participants, the privacy and data protection measures taken, the data collection instruments, the design and research aims of the sessions, followed by its analysis strategy.

3.1. Recruitment and Privacy Matters

Participants were recruited voluntarily from the Ageing Lab, through a partnership with the University of Aveiro. Although the number of participants in all sessions was not uniform (Table 1)—as unforeseen events could occur to them—the same group of participants attended every session throughout the two months, with an average of 18 participants per session, and a total of 27 individual participants. The average age is 74 (Minimum = 63; Maximum = 81; $SD = 5,15$), and 83% ($n = 15$) are women. Moreover, all participants have

shown great difficulties and low familiarity with using digital technologies—including using computers, smart-phones, and digital games.

Before starting the sessions, all participants signed an informed consent form stating that their participation was voluntary, agreeing to the collection of data through anonymized field notes, questionnaires, and photographs. Additionally, the possibility of withdrawing from the study at any time was reinforced, as well as their rights based on the General Data Protection Regulation (EU) 2016/679, and the Portuguese National Law 58/2019. Internally, to ensure this anonymity, information that could identify a user was not collected through the field notes and the questionnaire, limiting it to the strictly necessary, thus following a principle of data minimization; and photographs were captured without identifying the participants or anonymization techniques were applied and the original files were deleted.

3.2. Data Collection Instruments

Field notes were used to collect data, without requiring input from participants—which often causes biases—during the observation moment, or in a post-session reflection moment. These notes focused on difficulties, feedback, and observations during interaction, as well as the number of participants, and recorded quotes to illustrate interactions.

At the last session, and to complement the data from the researchers' diary, a self-administered questionnaire based on the technology acceptance model (Davis, 1989) and three key areas of the *DigComp 2.2* framework (Vuorikari et al., 2022; i.e., information and data literacy, communication and collaboration, and safety), was applied. The following is the set of questions posed, measured on a 5-point Likert-scale (ranging from *strongly disagree* to *strongly agree*):

Q1: Being able to use digital technologies and games is very useful, as it enables new learning moments (example: new places, people, news, knowledge, etc.).

Q2: Digital technologies and games help me research and obtain information daily.

Q3: Digital technologies and games contribute to improve my quality of life.

Q4: I started using more digital technologies and games to interact with friends, family, etc.

Q5: Digital games help me use the keyboard more easily (e.g., it is easier for me to find the letters, or I type faster).

Q6: Digital games help me to use the mouse more easily.

Q7: Playing digital games helps lessen my fear of damaging the technology or causing harm.

Q8: I gained curiosity to try new digital technologies and games in the future.

In the end, an open field for additional comments was provided, allowing more personal and complete views and opinions to be shared.

More specifically, regarding the questions based on the *DigComp 2.2* framework, Q1 and Q2 are included within the area of information and data literacy since it includes searching and processing information; Q3 is related to the area of security, focusing on protecting health and well-being; and Q4 is in the area communication and collaboration, as it assesses interpersonal interaction through digital technologies. The remaining questions are designed based on the technology acceptance model questionnaire. In the end, an open field for additional comments was provided, allowing more personal and complete views and opinions to be shared.

3.3. Designing Digital Game-Related Sessions

For two months—between 3 October 2022 and 5 December 2022—a set of 10 game-related sessions were iteratively designed and conducted in a computer-based setting, at the Ageing Lab. The rationale for only using computers during the sessions is that most participants did not have other digital devices, thus researchers provided them with equipment—a computer is still one of the most commonly owned digital devices (e.g., Salmon et al., 2017). Every week, two groups of older adults were divided into sessions of one hour each, encouraging the use of ICT through the computer and its peripherals (i.e., mouse, keyboard, and monitor), and familiarization with game-related strategies and online communities. In the context of this study, game-based sessions refer to the use of digital games as a tool to engage and immerse participants in activities and experiences to further promote the acquisition of knowledge and skills. The hardware used consisted of three Mac Mini (running MacOS), one Lenovo laptop (running Windows), four mice, and three keyboards. It is important to note that since these sessions are designed with web-based games, the operating system of the computers does not influence the interaction. Moreover, two researchers were always present, ensuring their correct operation. Table 1 presents the activities and research aims carried out in the aforementioned sessions.

3.4. Data Analysis

The analysis of quantitative data was performed using IBM SPSS Statistics (version 29.0.0.0), dividing the questionnaire responses into variables. Field notes were analyzed iteratively, allowing the design and development of the game-related sessions to be based on the feedback

Table 1. Description and research aims of the 10 game-related sessions carried out at the Ageing Lab between 3 October 2022 and 5 December 2022.

Session	Description	Research aims
(1) Research introduction and onboarding 3 October Number of participants: 19	Brief presentation of the participants and involved researchers. Introduction to game-related sessions. Participants were given complete freedom to play any game they wished.	The goal of this session was to introduce participants to the sessions' model and assess their game preferences regarding types, mechanics, and genres.
(2) Charades: Analog and digital platforms 10 October Number of participants: 15	A charades session was designed based on the <i>DigComp 2.2</i> framework and familiar games for older adults. Participants played in groups, with one person guessing a word based on descriptions provided by the others. The guesser was placed behind a screen.	The goal of this session was to assess participants' familiarity with the concepts discussed and their strategies for describing them.
(3) Player versus player 17 October Number of participants: 23	Based on the selections made in the first session, and the available online games, this session intended to have an online competition. For this, Tic Tac Toe and 4-in-a-row were used.	The goal of this session was to familiarize participants with the possibility of playing against each other online and help them realize that this could occur between them.
(4) Player versus player 2.0 24 October Number of participants: 15	This session was intended to engage players competing against each other online. However, this time the Naval Battle game was selected.	This session, although similar to the previous one, featured different game mechanics and interactions. It aimed to understand the acceptance of a strategic game.
(5) Tetris 28 October Number of participants: 9	In this session, the goal was to introduce a specific game that was very popular in the 1980s: Tetris.	This session aimed to enhance participants' keyboard skills while also evaluating their spatial orientation ability.
(6) Co-designing a quiz game 7 November Number of participants: 18	In a co-design approach, participants collaborated to design a quiz game. They worked in groups and registered questions and answer options in word-processing software.	This session aimed to familiarize participants with word-processing software and information searching, while also encouraging the use of a wider range of keyboard keys.
(7) Testing the co-designed quiz game 14 November Number of participants: 23	Based on the results of the previous session, this one intended to answer the quiz. Therefore, participants had to access/join the miOne online community (http://mione.altice.pt), access the games group, and reply as a comment to the different questions.	The aim was to encourage keyboard use and understand how participants searched for answers while exploring the social aspect of the online community.
(8) and (9) Drawing paths 21 November and 28 November Number of participants: 21 and 16	These sessions focused on playing Node, a game that involves using the mouse to connect dots and form multiple geometric shapes.	These sessions aimed to improve participants' mouse skills and cognitive abilities by providing activities that required precise mouse movements and fine motor skills.
(10) Player versus bots 5 December Number of participants: 16	Revisiting the games played in sessions (3) and (4), participants engaged in new versions that enabled them to compete against bots.	This session aimed to understand the relationship that players establish with an unknown entity that challenges them.

Note: At the end of the sessions, the questionnaire presented in the previous Section 3.2 was applied.

and needs identified. Thematic analysis was performed, based on a narrative synthesis, to better cross-reference all sources of information, and get a deeper and more realistic perspective on the lessons learned from older adults' participation and perspectives.

4. Results

After performing data analysis, and based on the literature that supports this research, the thematic analysis identified three major themes: (a) digital knowledge and competences, (b) player versus player versus bots, and (c) technological peripherals: helpful or a threat? The following sections describe these themes and main findings, while reporting the results of the field notes and applied questionnaire.

4.1. Digital Knowledge and Competences

Digital concepts are not usually part of this sample of older adults' daily vocabulary. Session (2), dedicated to charades on games and digital platforms, informed the thinking and knowledge within the digital world. Older adults showed analogical thinking towards concepts like database and file. Moreover, participants were reluctant to identify "computer virus," "internet," "password," and "social network." The following statements illustrate the aforementioned examples: "file room where all the information is," or "cover where you put the information"; "it erases everything, and it happens on mobile phones too," "we use something to communicate, but

sometimes we don't have it," "we can't give it to anyone and we must remember it," and "a lot of people come together in a space, in a network that is about people—we all live in a group," respectively. Additionally, considering the questionnaire responses (cf. Figure 1), Q1 shows a positive feeling towards learning more about digital technologies (15 totally agree and 3 agree); and most of them use it as a way to obtain information daily (Q2; 10 totally agree, 7 agree, and 1 neutral).

During sessions (6) and (7), participants reported the ease of word processing and editing while co-designing and testing a quiz game. Participants searched for information to support their own questions or answer those of others, leading to positive feedback on stimulating memory and creative thinking. These results are corroborated by Q3, where respondents stated that digital technologies and games contribute to improving their quality of life (16 totally agree and 2 agree).

4.2. Player Versus Player Versus Bots

The possibility to compete in online games was familiar to most participants. Although not all had experienced it, many had seen their grandchildren doing it. Sessions (3) and (4) changed that by challenging peer confrontation and placing participants in control of the interaction. Resorting to the used games, positive feedback was received, namely: (a) participants who claimed they wouldn't be able to use a computer, learned how to successfully handle the mouse; (b) by mixing elements from previously established groups, active participation

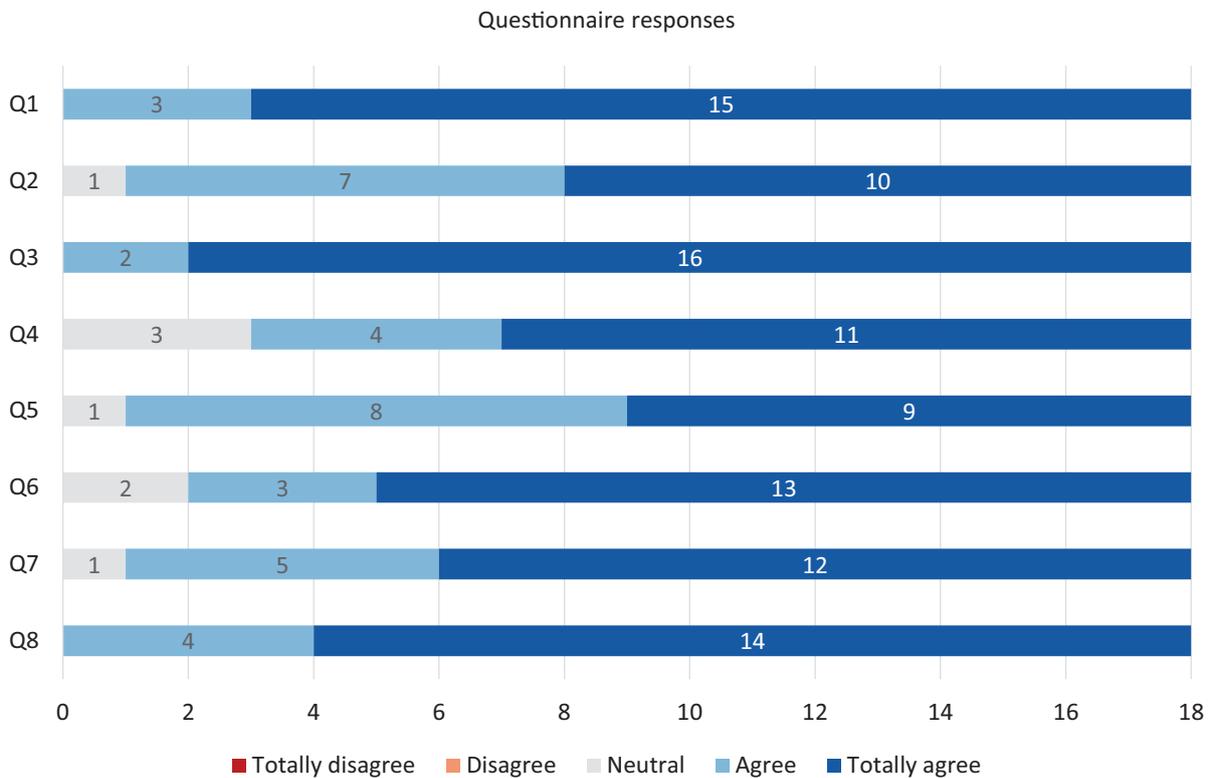


Figure 1. Stacked graph of questionnaire responses (*n* = 18). Note: cf. Section 3.2 for the complete questions.

was encouraged by all participants, increasing the feeling of confidence in digital technologies; and (c) healthy competitiveness emerged, where the different players competed with each other while recognizing it was mentally stimulating.

Moreover, due to the heterogeneity characteristic of older adults—which is also reflected in their relationship with ICT—some participants found the game mechanics and interaction too simple in session (3). Therefore, Naval Battle was introduced in session (4), giving more freedom to explore their abilities, without the frustration of losing a confrontation to another player, as demonstrated in the following quotes: “Look how cool it is, that is gone!” when one of their ships was defeated (Participant 1) and “It’s funny, isn’t it? It gives you excitement and adrenaline!” (Participant 4, reinforced by Participants 2, 3, 9, 10, 11).

Additionally, the social side related to using digital technologies and games was verified with the questionnaire’s Q4, where most participants mentioned they started using more digital platforms to interact with friends and family (11 totally agree, 4 agree, and 3 neutral)

Nonetheless, as mentioned in session (3), a stable internet connection and available players are not always guaranteed. Thus, during session (10), the same games were used, but with bots as the opponent. This provided varying difficulties, making previously simple games (since the game mechanics were already familiar) more challenging. Tic Tac Toe, on the medium level, was not considered challenging enough, whereas four-in-a-row, even at the medium level, proved difficult—participants mentioned: “this game is very difficult” (Participant 9) and another “we are being completely trounced” (Participant 17, reinforced by Participants 4 and 11).

4.3. Technological Peripherals: Helpful or a Threat?

During the 10 planned game-related sessions, participants had the opportunity to interact with some peri-

pherals from the digital world. In session (1) all participants chose games based on mouse interaction—e.g., domino, alphabet soup, solitaire, and checkers—such as clicking and dragging. Given this pattern, some participants believed that every time they had to move the cursor, it was required to keep clicking—which limited movement. Nevertheless, in the following sessions and with the help of their peers, the ease of use of the mouse increased exponentially—cf. Figure 2.

Moreover, with the Node game, sessions (8) and (9) were dedicated to training mouse use, while stimulating cognition through pattern drawing. The following observations were made: (a) participants who in the first session preferred to draw patterns on paper, then gained the confidence to do it directly on the computer; (b) at times participants realized they were doing the wrong path, continued until the end to practice using the mouse; and (c) strategies linked to their daily reality were created (e.g., by assigning street and bridge names to the path lines). Such was confirmed by the noted quotes: “We like those who put up a fight” (Participant 3), “I was saying I didn’t know, and now we are already experts” (Participant 9), and “this is really nice” (Participants 4, 7, and 12). These observations are supported by Q6, stating that digital games helped them to use the mouse more easily (13 totally agree, 3 agree, and 2 neutral).

Although participants mentioned that digital games helped them to use the keyboard more easily (Q5; 9 totally agree, 8 agree, and 1 neutral), this was the question that had the least consensual answers. In fact, one participant stated that “I just haven’t understood much yet. I’m still learning how to use the keyboard, but I’m on a good track.” In addition to sessions (6) and (7), where frequent difficulty was shown in finding letters while writing or in following what was already written, session (5) involved the use of only four keys maximum for playing Tetris. It is worth mentioning that this session is a visible outlier regarding the number of participants ($n = 9$), and therefore the analysis of the results should



Figure 2. Examples of peer-to-peer support during sessions at the Ageing Lab.

be performed with extra caution. However, it can be pointed out that some participants forgot what the keys were for and had to (re)think through the process again while mentioning “this is moving very fast” or “I don’t like any of this.” Also, a minority of participants were familiar with the keyboard layout and with the spatial dimension of the Tetris pieces after a short time.

These sessions demystified the threat of digital peripherals and improved participants’ quality of life through digital technologies and games (Q3; 16 totally agree, 2 agree). Participants also felt less fear of damaging technology (Q7; 12 totally agree, 5 agree, 1 neutral). Moreover, the questionnaire reflected positive feedback, such as “attending these sessions is very enriching. The relationship with peers is very good and the increase in technological knowledge is favourable to our minds,” “I really like the new technologies. It helps me to live,” and “new technologies help you enter new worlds and diverse areas.” Additionally, they expressed an increased curiosity about experimenting with new digital technologies and games in the future (14 totally agree, 4 agree).

5. Discussion

The research conducted within the scope of the game-related sessions at the Ageing Lab allowed further insights into older adults’ needs and preferences relative to game-related activities for AHA. It also has paved the way for a broader discussion on designing and developing social digital games for senior online communities, and its ability to impact AHA and digital competences. In particular, the social side was deeply stimulated and encouraged (Domahidi et al., 2018; Llorente-Barroso et al., 2021; Quan-Haase et al., 2018; Schell & Kaufman, 2016; Urbina et al., 2022), as the interaction between participants was highly valued. In fact, the majority reported Allaire et al. (2013) having started to use more digital technologies and games to interact with friends and family. Additionally, some strategies had an impact on or sustained the participants’ perception of their health, and quality of life improved with the use of digital technologies and games. These results are in line with previous studies, e.g., Allaire et al. (2013), Martin et al. (2016), and Vosner et al. (2016) that show that digital technologies and games play an important role in increasing individual participation in society and improving one’s security—although disparities in the perception of security and in the trust placed in operations related to online commerce and government are still registered (Llorente-Barroso et al., 2023). It is also worth emphasizing that new learning moments were encouraged, and information searching was stimulated—providing individuals with the necessary background knowledge and competences to enable them to participate proactively and safely in their (online) communities.

In fact, from a digital competences perspective, results show that the dimensions of information and data literacy, communication and collaboration, and safety

can be enhanced by game-related technologies. As highlighted by multiple researchers (Caroppo et al., 2017; Pyae et al., 2016; Watters et al., 2006), digital technologies and games, in a seemingly antagonistic way, can help acquire digital competences and mitigate some entry barriers posed by their design or preconceived ideas. In fact, it was possible to observe that older adults use strategies related to their daily lives and from other contexts to describe a reality that is not yet completely familiar to them. Participants showed interest in continuing to use digital media in the future. Through the quiz-building sessions, they improved their information and data literacy by exploring information search and fact-checking when trying to answer questions. This also raised awareness of digital technologies for social well-being and social inclusion, improving safety competence. Additionally, digital technologies and games fostered social interaction among friends and family, as well as close collaboration among peers, promoting communication and collaboration competence. Again, and in a complementarily bilateral approach, a set of digital competences was promoted which is increasingly relevant in today’s World while fostering AHA—thus increasing older adults’ digital inclusion (Han & Nam, 2021).

Simultaneously, the exploration of collaborative and informed design with older adults was quite well received, showing great involvement from participants, and reinforcing the importance of their involvement in applied research. This strategy has been widely used in several studies with older adults (e.g., da Silva et al., 2021; Kort et al., 2019), allowing them to achieve results that inform the development of digital products that are close to the preferences and needs of the target audience. In addition, close observation of older adults’ interaction with digital platforms has allowed the formulation of the following design and development recommendations (complementing previous studies, e.g., Gerling et al., 2012; Machado et al., 2018; Marston, 2012): (a) allow players to play without an internet connection, as the internet can be unstable; (b) have clear instructions on which peripheral to use; (c) present explanatory guiding tutorials before each level—and accessible at any time (e.g., Schlomann et al., 2022); (d) do not use time-sensitive challenges, as it can cause frustration; and (e) allow social contact within and outside games, since it is highly valued by older adults.

Lastly, adding to previous studies (Ferreira & Veloso, 2015; Pappas et al., 2019), although not explicit in *DigComp 2.2*, older adults’ ability to use technological devices and their peripherals was also assessed. Without this prior knowledge, reaching more advanced levels of digital competences would be challenging. Thus, despite the observed impairments in fine motor skills, mouse and keyboard usage showed significant improvements throughout sessions. Therefore, continued contact and stimulation of its use proved to be important for greater proficiency and ease of use.

6. Conclusions

This research further extended current knowledge on the relationship between older adults and digital media—in particular, online communities and digital games. Results show the preponderant role of these media in AHA and in stimulating digital competences, which was understood and reaffirmed. Specifically, (a) digital media have the ability to foster AHA in its dimensions of participation, social interaction, and psychological, and social well-being; (b) participants' digital competences in information and data literacy, communication and collaboration, and safety were fostered through engagement in social, research and sharing activities; and (c) continued contact with technological peripherals, such as mouse and keyboard, stimulates digital proficiency for navigating a digital world.

Nonetheless, some limitations should be considered. First, the applied questionnaire has a positive bias in its questions. However, when referring to some examples from *DigComp 2.2* (Lucas et al., 2022) or an example of the *Attitudes Towards Technology Questionnaire* (Zambianchi & Carelli, 2013), it was possible to conclude that it is a cross-sectional practice. In fact, after years of contacting and developing research with the target audience, it was observed that complex sentence structures—which often resort to double negations—were not easily understood, leading to a simplification of the language used. Second, the questionnaire should be applied transversally across the research. Even though great difficulties and unfamiliarity with digital technologies were recorded at the beginning of the study, and the questions were asked to lead to a reflection of the pre- and post-experience, it may lead to a positive bias in the questionnaire results. And third, a convenience sample was used. Thus, caution must be applied when extrapolating these results to other contexts.

Future research should use a larger and more diverse sample of older adults for a confirmatory approach. Additionally, more game-related sessions could be planned, incorporating a wider range of dimensions from *DigComp 2.2* and different strategies to promote AHA, leading to more accurate longitudinal results. Furthermore, due to one of the aforementioned limitations, the developed questionnaire can be applied to several moments of the research. Lastly, and since this study was useful in understanding how digital games may foster older adults' AHA, there is the prospect of integrating these mechanics into the context of senior online communities and potentially expanding the possibility of creating further impact within the physical context.

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Conflict of Interests

The authors declare no conflict of interest.

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Article

Elder People and Personal Data: New Challenges in Health Platformization

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Abstract

In Uruguay, as in many countries around the world, healthcare providers are looking to digital technologies to enhance service provision. This includes introducing new data-intensive systems that facilitate connections between healthcare providers and patients and maintaining records of these interactions. This article considers the numeric ability of older citizens to critically assess the implications of platformization and datafication within the Uruguayan healthcare system with a view to identifying implications for digital literacy programs. The ability of older people to manage their personal data within healthcare systems shapes their ability to enact citizenship and human rights. This reality came into sharp relief during the recent Covid-19 pandemic, demonstrating the extent to which core social services have become datafied and digitally mediated, as well as their potential to deepen digital divides where senior citizens are concerned. Critical perspectives on technological change, well-being, and ageing offer useful perspectives on this challenge. Drawing inspiration from these perspectives, in this article, we explore the results of a digital literacy initiative that worked with 16 seniors to explore their experiences of personal data collection within Uruguay's new National Comprehensive Health System. Our approach simultaneously worked to build digital literacy while also revealing the complex relationships and disconnections between the ontological frameworks mapped onto healthcare by systems designers and the reality of older people. In the conclusions, we consider the implications of these observations for seniors' digital literacy interventions that foster seniors' critical understanding of their data subjectivity in the context of local healthcare systems.

Keywords

datafication; digital literacy; health care; platforms; seniors' digital literacy; senior citizens

Issue

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1. Introduction

Van Dijck et al. (2018) understand platforms as a kind of "programmable architecture" and argue that these systems should not be understood as mere intermediaries but as shapers of reality and ways of living. She argues that they are facilitated by new infrastructures for collecting data, and new ideologies about the power of data, which together have allowed for the introduction of new forms of "dataveillance" (Van Dijck, 2014). Further, data-veillance is institutionalised through the mechanisms of datafication (the collection and circulation of data),

commodification (its transformation into tradable entities), and algorithmically driven selection processes that curate interactions "through often black-boxed techno-commercial strategies" (Van Dijck et al., 2018, p. 41). The resulting platforms allow for continuous digitisation and monitoring of people's bodies and practices (Clarke & Greenleaf, 2018), and they also have ontological force (Helles & Flyverbom, 2019), which is to say that they have real implications for the constitution of discursive fields, institutional frameworks, and social experiences.

In these systems, rationally validated consent from data subjects proves to be an ongoing challenge. This is

partly because individuals do not fully understand the links between data transfer, processing, and monitoring (Méndez & Botti, 2021). However, it is also because they find themselves without alternatives to the platforms that increasingly condition access to essential social services. This creates the experience of “surveillance realism” (Dencik & Cable, 2017), in which people are aware of the normalisation of data gathering and their limited possibilities for agency within this new reality. This is often because systems themselves have been designed around modes of transacting that centre data collection and transaction management over situated identities and unique interactions. Furthermore, without effective spaces for complaint, platform users become complicit with the reproduction of platform logic to the detriment of people’s individual rights (Waisbord, 2013).

Gurumurthy et al. (2021) argue that, in stripping people of their identity data, platforms constitute new sites of exploitation in intelligence economies. Platform owners mobilise these data to produce instruments of economic and political control. People and communities lose decision-making autonomy as they become subordinated to the logics of “platformization,” built around the massive rollout of immediate gratification in exchange for personal data. In other words, the reductive logics built into platforms draw on and process data in ways that shape subjectivity and social experience and which overlook the complexity and plurality of human experiences, as in the case of people’s complex and varied experiences of ageing (Cozza et al., 2019; Powell, 2005).

Indeed, digital transformations in healthcare are creating new forms of technological mediation that older citizens have to navigate (Hintz et al., 2017). Past research has demonstrated that technological inequality has a significant and complex impact on older people (Casado-Muñoz et al., 2015; Hunsaker & Hargittai, 2018; Quan-Haase et al., 2018). This group was not only disproportionately affected by the recent Covid-19 pandemic due to the weaker immune systems that accompany age, but it also experienced digital inequality as the population group most excluded from access to information and communication technologies (ICTs), and the internet (Llorente-Barroso et al., 2021; Ramos-García et al., 2021). These conditions, of course, leave seniors at risk of being excluded from health care, but they also put them in the position of not being able to question how their personal data is taken up when they access services.

The importance of digital literacy as a condition for pursuing datafication in healthcare has been recognised for some time (Lun, 2018). But critical scholars have marked a distinction between the technical forms of literacy necessary to participate in digital transformation and the “personal data literacies” required for citizenship given the rise of platformized systems (Pangrazio & Selwyn, 2019). There appears to be a lack of awareness about the risks created by the uptake of personal data within health information systems, and a lack of capa-

city to analyse the costs and benefits of entering into these systems.

Research into seniors who lay on the other side of the “intergenerational digital divide” or “grey divide” has characterised older users as “upstarts,” “digital outcasts,” or “late adopters” (Peral-Peral et al., 2015). These characterisations present a homogenised view of the elderly population and lead to policies that fail to address the specific experiences and needs of diverse elderly populations. Recent studies have even found diverse technological uses among the various “technological generations” found within groups of older people (Loos & Ivan, 2022).

Research also confirms that ICT use significantly benefits older users’ quality of life, but these benefits are not automatic (Friemel, 2016; Sourbati, 2009). To the extent that elderly people use ICTs, they have more access to information, achieve greater autonomy of knowledge and psycho-emotional well-being and against cognitive decline, but the benefits of these flows depend on conscious, attentive, reflective, and moderated use of ICTs (Llorente et al., 2015; Shapira et al., 2007; Tatnall, 2014; Casamayou & Gonzalez, 2017; Li, et al., 2022).

However, the increased use of personal data for the delivery of essential services, combined with cultural assumptions about older people, can increase the exclusion experienced by this sector of the population (Sourbati & Loos, 2019). This demonstrates the need to support the development of digital capabilities among older people to enable their agency and recognise their societal contributions (Ramos-García et al., 2021; Urbina et al., 2022). The pandemic demonstrated that social services increasingly depend on digital capabilities—and that not having these put seniors’ access to services at risk, with negative implications for their rights (Llorente-Barroso et al., 2021, 2023).

Factors such as older people’s predisposition to use or understand technology, their desire to feel useful, or their need to remain integrated into society should be considered (Casado-Muñoz et al., 2015; Colombo et al., 2015). Several studies have criticised visions of technologically driven intervention that ignore the needs, perspectives, and beliefs of older people, or that take up paternalistic approaches (Greenhalgh & Stones, 2010; Joyce et al., 2015; Neven & Peine, 2017; Peine et al., 2014). Studies conducted in Uruguay (Escuder, 2015; Rivoir, Escuder, & Liesegang, 2020; Rivoir, et al., 2019; Rivoir, Morales, & Landinelli, 2020) reflect similar results regarding the motivations, uses, and perception of benefits by the elderly.

Recent studies extend these observations into the spaces of platformization and datafication in order to examine the implications of digitised models of service provision for older populations. These studies consider how procedures and categorisations embedded in information systems produce bias in knowledge about the elderly or how these systems “narrate” the elderly body. Dalmer et al. (2022) argue for abandoning stereotypes around age and socio-technical relations that often

inform the categories used in datafication and assert the need for a more diverse and participatory gerontological-technological culture. In their analysis of self-monitoring and surveillance through health technologies in the context of elder care, they demonstrate the socio-technical power of numbers over ageing bodies. Based on this, we should resist techno-optimism about the potential of these technologies to keep ageing populations healthy and autonomous. Rosales and Fernández-Ardévol (2020) meanwhile point out that platforms are often the product of discriminatory designs and algorithms. Addressing this problem requires that users be given greater control over the data provided to digital platforms and that algorithms be made more transparent.

These works express concern about how the new ontological forces and patterns of surveillance embedded in platformized services represent the needs, desires, or values of older people, and what they mean for policy, systems, and service offerings. More broadly, this literature considers the implications of datafied transactions within platformed systems for the expression of care, meaning and belonging. These considerations were magnified by the recent Covid-19 pandemic. It revealed the extent of the digital systems put in place to mediate everyday services and evidenced gaps in regulatory frameworks meant to uphold the digital rights of citizens (Lago & Rivoir, 2021; Nguyen et al., 2021), illustrating the potential for platformization and datafication to deepen digital inequalities.

2. Context

In 2007, Uruguay implemented results-oriented healthcare reforms to create standardised logics and improvements in service quality (Larrouqué, 2018). Users of the National Comprehensive Health System (SNIS) freely choose their private or public health provider and are entitled to universal and comprehensive health coverage. As of December 2019, 71.5% of the country's population was part of the system, with 23.5% being retirees. Among providers, 77% belong to the private sector, 20% to the public system, and 3% are private insurers (Junta Nacional de Salud Ministerio de Salud Pública, 2019).

In 2011, the SNIS created a national electronic health record (EHR; Agencia de Gobierno Electrónico y Sociedad de la Información y Conocimiento, n.d.) known as *Mi Historia Clínica Digital* or *My Digital Clinical History*. This system establishes a framework for data collection in which information collected by individual healthcare providers can be shared across instances of healthcare provision. Data collection and use is legislated by Law 18.331, which establishes that healthcare providers are responsible for implementing administrative procedures that guarantee the security and custody of EHRs. In addition, Uruguay has a personal data protection law that includes habeas data protections. These two data laws coincide in putting the responsibility for managing personal data on individual healthcare providers. Health providers must

guarantee informed consent, patient-doctor confidentiality, the security and confidentiality of EHRs, protection from tampering, and prevention of data leaks.

The experience of older groups in this system is of particular concern. Over the past two decades, Uruguay has seen strong diffusion of ICTs in the marketplace, accompanied by a dedicated national digital policy agenda to support technological uptake in social services, including healthcare. In 2015, given their experience of digital exclusion, the Uruguayan government created Plan Ibirapitá to provide senior citizens with devices, connectivity, and basic training. While the proportion of people over 65 accessing the internet rose from 12% to 49% between 2010 and 2019, uptake remains low, with only one in three using ICTs daily (Agencia de Gobierno Electrónico y Sociedad de la Información y Conocimiento, 2010, 2019).

While seniors are taking up ICTs in Uruguay, this group has uneven capacity and experience with digitised systems. Meanwhile, healthcare is taking up personal data and ICTs in new ways that have important implications for well-being. For programs such as these to be successful, they must be built on a situated understanding of how seniors experience the SNIS and EHR as well as how new forms of surveillance and new ontological forces map onto their lived reality.

3. Methodology

Given this backdrop, in the balance of this article, we share the results of an action-research intervention that used a set of data literacy interventions to explore seniors' perspectives on sharing personal data with healthcare providers (Reilly et al., 2020). This work was conducted from June to September 2021 in Uruguay, in Spanish, by researchers affiliated with the ICT Observatory (ObservaTIC) at the University of the Republic in Uruguay. It set out to identify older people's understanding of data, their perceptions about the use and value of that data, and their needs regarding the management of their personal data in platformed contexts. This work was carried out as part of a larger study of how people experience datafication in Latin America, funded by Canada's Social Sciences and Humanities Research Council (SSHRC). This work builds on a well-established relationship between ObservaTIC and the Centro Interdisciplinario de Envejecimiento (Interdisciplinary Center on Aging) in Uruguay focused on access to ICTs and digital literacy among older people in Uruguay.

This action-research intervention (Denzin & Lincoln, 2000) drew on "a praxis-oriented research tradition whose objects of concern are mediatization and informatization, and whose key demand is that our work responds to the world learners encounter" (Poyntz et al., 2020, p 8). Interventions were designed to evoke experiences and reflections with sharing of personal data as a starting point for dialogue and learning. This methodology facilitated an in-depth exploration of the

perceptions and visions of participants from their situated point of view (Arriazu, 2007). This action research intervention surfaced diverse experiences and ways of understanding and laid the groundwork for collective understanding and change (Sibilia, 2012). To this end, critical epistemological reflection was essential and aimed at addressing dogmatism around personal data (Vasilachis de Gialdino, 2009). A phenomenological engagement with the data is offered, centred on the perspectives shared by actors, with a view to developing a greater understanding of their experiences. This approach helps us understand participants' experiences and perspectives and is not meant to produce generalisations or representative results.

Initially, the project planned to carry out in-person workshops, but given the declaration of a national health emergency due to the Covid-19 pandemic and because the target population for this research is considered high-risk, community interventions were realised through synchronous Zoom meetings and asynchronous WhatsApp chats. Purposeful sampling was used to identify a small group of participants with diverse backgrounds. Open invitations were offered to people aged 65 and over (the retirement age in Uruguay), residing in any part of the national territory, and affiliated with a private health provider as established by Law 18.211, which regulates the National Integrated Healthcare System. These included providers affiliated with the Collective Medical Assistance Institution, the Private Medical Assistance Institution, or private insurance companies. Invitations were distributed via the National Network of Organizations for the Elderly, the National Organization of Associations of Retirees and Pensioners of Uruguay, and the Open University for Informal Ongoing Education of Older People. Based on the initial response, a heterogeneous sample was further developed by applying a snowball strategy (Goodman, 1961) which allowed us to amass a group of 16 participants.

The study was undertaken in two phases. Phase 1 included two synchronous Zoom meetings plus three weeks of asynchronous dialogues via WhatsApp, which were facilitated according to the techniques described above. The initial Zoom meeting served to outline the project, complete an informed consent process which followed Canadian Tri-Council standards for ethics as reviewed by the Office of Research Ethics at Simon Fraser University, introduce participants to each other, and explain how the dialogue would be managed over the coming weeks. These processes were animated by an activity in which participants thought about data concerning the many different names they carry as a person (nicknames, professional designations, etc.). Participants also discussed their access to and use of digital technologies and shared some initial thoughts about data.

In the first week via WhatsApp, the groups worked through a creative and participatory activity that allowed them to identify the types of data that they come into contact with in their daily lives and identify the mul-

tiiple meanings and valuations they attach to different forms of data. In the second week, the groups were asked to think critically and reflexively about the digital trails we leave in our daily lives. This established a foundation for discussing participants' perceptions of corporate data use and participants' material or symbolic valuations of data. Based on this, the groups were asked to contemplate their individual criteria for corporate use of personal data. Finally, the third week took up the themes of responsibility and security. Based on the view that people have practical knowledge that makes them experts in their own reality, participants were asked to identify potential ways to improve their daily experience where personal data is concerned.

The second phase was carried out via Zoom and constituted the closure of the process. Participants put the skills they had developed into practice by carrying out a "citizen data audit" of private healthcare providers, and they identified their needs and possible avenues for change. This work centred participants once again as experts in their own reality.

The synchronous meetings facilitated interactivity and dialogue between people in different geographical locations. They were complemented with asynchronous instances that allowed for more sustained and reflective exchanges. WhatsApp allowed participants to share and develop their perceptions with the group in a cumulative manner over a longer period. Participants were organised into three WhatsApp groups based on their frequency of WhatsApp use (every 1–4 hours, every 5–9 hours, more than 10 hours). Among the principal advantages of this research technique were reduced costs, better accessibility, lowered inhibitions among participants, easy transcription, and an alternative way of approaching communities to build local knowledge. The disadvantages included the potential for exclusion due to patterns of digital access or connectivity and barriers presented by digital competencies. The instruments used also prioritised digital communications mediated via text and audio, which removed other sources of information, such as non-verbal communication.

We analyse the experiences and reflections shared by participants, which have been organised into thematic dimensions. These are conceptualisations and perspectives on data, uses of data in healthcare service provision by participants, and the advantages and disadvantages of datafication in the healthcare service, given the needs of older groups. In what follows, we present aggregate results without distinguishing by gender, place of residence, or ICT use since we detected no substantial difference between segments.

4. Findings

4.1. Perspectives on Data

Given their phenomenological approach, workshops began by eliciting stories about participants' experiences

of data sharing in healthcare settings. These stories revealed participants' situated perceptions of what data is. We found that there was an important tension between how data (*el dato* in Spanish) is understood colloquially in Uruguay versus the way data has come to be mobilised in the context of healthcare platformization. Indeed, one participant offered that "the word data has different meanings depending on the context."

In Spanish *el dato* is understood colloquially to mean "the details" as in *dame el dato*, which could be translated as "give me the deets," as it might be said in English slang. Similarly, one participant shared:

Speaking of data, I think that the word is broader and can have other meanings. Who has not said or heard, "I'll pass on the data." This is referring to a situation in which it is assumed that the other person does not know, and that possibly few people know.

However, this understanding does not directly map onto how data is thought about in the Western scientific tradition that informs both healthcare and information systems management. Rosenberg's (2013) genealogical work shows that the word data entered English from Latin, meaning "to give." This usage emerged during Enlightenment debates about the nature of interpretation. Hence, as "dado" (from the Latin verb *dare* or Spanish verb *dar*—to give) passed into English as "data," it came to mean "what is taken as given" and became a basis for asserting reasoned processes of argumentation as distinct from hermeneutic forms of interpretation (see Rosenberg, 2013, p. 18).

This is a fascinating point to consider in a healthcare setting. Data can be understood as a starting point for reasoned assessments of health and wellbeing, but data is organised by culturally specific categories that are socially constituted as indicators of health. For example, weight is used as an indicator of health and well-being, but it has also been shown to produce weight stigma linked to negative health and well-being outcomes (Pearl et al., 2020). Meanwhile, our participants perceived data to be the information considered worth sharing in the context of social relations, which in this case would be shaped by cultural roles and power relations enacted between doctors and patients. Both the perception or experience of those relations and notions of what types of information are worth sharing will be specific to the cultural experience of elderly persons within the Uruguayan healthcare system.

With this in mind, it is interesting to note that participants recognised typical socially normalised determinants of personhood: name, height, identification number, nationality, date of birth, and sex. They shared that they frequently experienced healthcare as a transaction mediated by a narrow range of data categories and pointed out that refusing to share this data would exclude them from healthcare services: "It is really up to us whether we share [our data] or not. Because, of course,

we can refuse to share it. But that would imply being left out of the system."

This raises important questions about the nature of consent in healthcare for ageing subjects. Consenting to share one's data not only creates a basis for a medical diagnosis in the context of doctor–patient relations but also involves accepting a set of reductive categories that determine or "select" how ageing is viewed and how those categories mediate access to social services. Thus "what is taken as given" has become folded upon itself in the design of mediated healthcare systems as they come to establish the context for social relations. Or, returning to the concepts offered by Van Dijck et al. (2018), participants in healthcare systems become complicit in nurturing the "algorithms" that shape platform-driven selection processes, and thus also complicit in monitoring, and therefore ontologising, the elderly body in ways that removed autonomy over the definition of their own subjectivity.

Finally, we were struck by how participants introduced conceptions of data that flow from policy debates in the national public sphere. In a form reminiscent of Van Dijck's (2014) "dataism," terms like personal, private, or sensitive data were already present in our participants' narratives. Through our interventions, participants became aware that these terms are often reproduced in public discourse without careful consideration of their meaning. They revealed that while personal privacy has been heavily explored in public discourses about the digital economy, when it comes to datafication of health systems, the potential to enhance wellbeing, particularly given their advanced age, is as much or possibly more important to them than ensuring data security and privacy. This demonstrated a disconnect between the design solutions that convince users to take on new information systems (i.e., guaranteed data privacy), the cultural experience of data as something that mediates the experience of wellbeing, and the values or desires of elderly participants as simultaneously the subjects and the objects of health information systems.

4.2. Elderly People, Data, and Provision of Care

Our exploration of senior participants' experiences with data in the Uruguayan healthcare system also highlighted the extent to which individuals must navigate a complex information landscape marked by multiple actors, complex information flows, and competing interests, as well as the strategies used to manage this reality.

When healthcare providers are perceived as safe spaces, participants had few concerns with sharing health data. As one person put it, "When we are linked to a reliable provider, then perhaps we do not worry or question ourselves when sharing our data." In this context, data sharing is seen in positive terms:

We know that our data remains in the computer, and I am interested in keeping it there. Because in case of

an emergency, they already have our data, and they can help us. I think it's perfect that they are collecting it.

It is interesting to note the importance that participants placed on the reliability of the healthcare provider in the Uruguayan system, given that the system itself makes the provider the main point of care.

This same observation points to the potential for uneven use of data across the various instances that access the EHR system, which is made up of a variety of service providers, both public and private. As participants themselves noted, the exhaustive collection of data by the centralised EHR does not guarantee that information will be used productively during a medical consultation or that patients' needs or feelings will be taken into consideration. In a complex informational landscape, and given the competition between healthcare providers, this raises questions about the criteria older people might use to judge whether the EHR is being used appropriately to support their well-being.

Meanwhile, the system also creates a dependence on healthcare providers to access and make sense of health records. The SNIS has produced digital applications to facilitate self-management of healthcare, but as one participant shared: "I have an app from my provider that provides me with some things, but not access to all the data they have about me." Participants indicated little understanding of how their data "journeys" through the digital instances of the SNIS, to draw on the work of Bates et al. (2016), nor what implications the pathways traversed by healthcare data have for social and economic relations between patients, doctors, and third parties within the healthcare space.

Taking this into consideration, participants shared several concerns about the possible risks or disadvantages of sharing their data in Uruguay's healthcare landscape. Given the centralisation of health data, one person said, "If we look at things critically, we'll lose our minds because they have our lives in their hands." In this vein, participants shared their anxiety about the commodification of health data and its use for commercial or criminal purposes. As one person said, "I think certain people with bad intentions can employ data in an illicit way to offer services. They especially target older adults. We must be attentive."

As described in the context section above, the Uruguayan healthcare system includes a variety of controls to protect healthcare data. But our participants argued that information systems are only as good as those who use them. They saw human factors as the most likely cause of data breaches and argued that confidentiality clauses in regulations, national legislation, and control mechanisms are of little use if healthcare providers cannot be trusted.

These results suggest that for older adults in Uruguay, feelings of trust in relation to individual healthcare providers and demonstrated healthcare outcomes in terms

of wellbeing enhancements may outweigh datafication concerns or techno-optimist narratives when navigating healthcare options. Returning to larger considerations, when people feel they are being addressed with dignity as complete individuals and when their individual needs are being met, they may be less likely to express concern about the risks of digital surveillance. However, this set of observations raised an important tension between how individuals are treated and the nature of the overall system. When platformized surveillance and selective mechanisms lead to reductivism in healthcare practices, the potential for humanised care with dignity may be reduced.

4.3. Emerging Needs: Ethical Data Management and Responsible Citizenship

Lastly, we worked with participants to identify the criteria they might use to evaluate data uptake by medical service providers, and we used this activity to develop the critical data literacy of participants. By exploring criteria, we hoped to leave participants with tools that would help them better understand and navigate the datafied and platformed healthcare landscape and think through its implications for healthcare access as well as feelings of personal recognition, autonomy, and well-being.

One consideration that arose in this discussion was the issue of consent to share personal or health-related data. It emerged that confidentiality presents in unique ways for older adults. One participant expressed concern, for example, about how health data would move between different healthcare instances in the country, such as in-home healthcare providers, companion services, and medical doctors. This individual felt that "only the medical provider should hold [the data]." This example highlights the need for a culture of consent that puts the data subject at the centre of decision-making around who can access their data and for what purposes. This is a complex proposition given that older individuals may become increasingly reliant on family, the community, the state, or private health care services to provide for their well-being as they age.

The final workshop also helped participants explore criteria they might use to evaluate the use or uptake of health-related data. Responses here varied as participants tried to work through the complexities of how data gets taken up in the provision of care. One participant suggested that data must be handled according to "the parameters of ethics, medical ethics, administrative ethics." Others approached this question pragmatically, arguing, for example, that data shared with medical professionals should be used to improve health and well-being outcomes for all citizens. Still, other participants emphasised empathy and feelings as the main arbiters of data use, recalling contributions from data humanists such as D'Ignazio (2022), who writes about the need to sustain the humanity of numbers. In the

context of accelerated platformization and digitalisation, the participants demand humane and attentive health-care carried out with tact and dignity. They argue that this has been lost as “life” has been algorithmized and health and other social and community spaces have been platformed.

While there was no clear consensus around how data use should be evaluated within the healthcare system, it is interesting to note that participants were all drawn to considerations of care rather than, say, efficiency or business processes. It also shows that when given the chance, healthcare users are interested in and capable of evaluating platformized systems and asking questions about the black-boxed techno-commercial strategies (Van Dijck et al., 2018) that have so much force in shaping medical interactions and defining the elderly body.

The workshops concluded with discussions about how senior citizens can respond to the challenges of datafication. Given the complex information landscape described in the previous section, participants can be forgiven for being “a bit irresponsible or complacent. We do not make demands. We are very passive.” Another noted that “we do not exercise citizenship as much as we should.” Despite not expressing their citizenship around health data, participants certainly recognised the need for a critical position on their data subjectivity and its implications for health and wellbeing.

As an alternative and possible way forward, participants expressed the need for spaces where the elderly can share their experiences with the digitisation of healthcare and engage in peer-to-peer dialogue that would allow for empowerment and autonomy. As one person shared:

Now, to summarise a little: This group should continue because, for me, it has been a learning experience. Each time you talk, things come up that make us question more, make us question more whether we are sharing our data with care or not, whether we are doing things well or not for our benefit.

In the Uruguayan case, spaces such as these could be convened by groups such as the National Network of Organizations for the Elderly, the National Organization of Associations of Retirees and Pensioners of Uruguay, or the Open University for Informal Ongoing Education of Older People. But we feel it is also important to recognise such initiatives as an extension of digital literacy campaigns such as Plan Ibirapitá. That is to say, the focus should not only be on devices, connectivity, and training but should also extend into critical literacy skills that help people navigate the social impacts of the changing “programmable architecture” of the platform economy. Older people need spaces to discuss and figure out how to address the implications of platformization for changing standards of care and how this is shaping their subjective experience as senior citizens.

5. Discussion and Conclusions

In this article, the experiences and perspectives of elderly participants regarding platformization and datafication in the Uruguayan healthcare system were critically analysed to uncover implications for digital literacy programs. Drawing on a phenomenological approach, this work revealed complex relationships and disconnections between the ontological frameworks underpinning the platformization of health care and the reality and needs of older people, given their subjectivity.

This work confirmed the significance of context for the meaning of “data.” In particular, the polysemous perspectives on data revealed by this case account for the various aspects of digital subjectivity that emerged during the study. In the context of health care, data offer health and well-being indicators, which are taken up in the design of digital platforms. But participants also understand data as information worth sharing given the cultural context or specific social relations. In this context, participants often experience healthcare as a mere transaction of data flows, flows which appear to shape their identity as users and which come to narrate their ageing bodies.

This “data subjectivity” is shaped with or without patients’ consent, which means that they find themselves held hostage by the question of whether to share data. Refusal implies exclusion from health care services, but sharing makes them complicit in the reification of the categories they are subject to. This is how the categories that articulate local views on ageing, access to services, and, ultimately, citizenship are implicitly legitimised (Dalmer et al., 2022).

Participants indicated that while they value data privacy and security, they prioritise access to healthcare services since they are at a stage of life where this is important. As a result, concerns about the ontological power of dataveillance (Van Dijck, 2014) take second place after individuals’ immediate needs, values, and desires.

Beyond existing legislation or institutional mechanisms, participants focused on trust in their healthcare provider as the main guarantee of appropriate data use and management. This is because they attribute failures in data management and use to human factors. At the same time, it was evident that participants were unaware of Uruguay’s regulatory frameworks, which protect personal data, or specific regulatory provisions related to healthcare providers’ transfer, storage, and management of their data. Indeed, as individual subjects, they hold themselves responsible for not taking measures to protect their data or for not choosing to file complaints where they see failings in this system. In this sense, they take on individual responsibility for managing their own data (Sibilia, 2012). This, without a doubt, constitutes an obstacle to collective efforts to address shortcomings in information systems.

As our intervention unfolded, some participants came to demand ethical, responsible, and humane

mobilisation of their data. We attribute this to their growing literacy about data policy and uptake in Uruguay as the result of our interventions. This suggests that the criteria used by Uruguay's national agencies should be updated to recognise shifting experiences of data subjectivity over time. Beyond existing frameworks, including responsible and safe use, critical and reflective use, and creative and participatory use, it would be useful to recognise the situated nature of data and its complex relationship with changing subjectivities.

The spaces created for this study were effective spaces for the co-constitution of opinions about the management of data and allowed participants to reflect on and express opinions about the expression and transformation of their digital subjectivity. Spaces such as these would allow new subjectivities to emerge within the situated context of Uruguay's unique historical experience, culture, and health system. As other research has already pointed out (Dalmer et al., 2022; Rosales & Fernández-Ardévol, 2020), the involvement of older people in the evaluation of digital systems and their everyday manifestation, as in the case of healthcare settings, will ensure that their needs and values, and their vision of old age and ageing are reflected in policy frameworks for the digital economy—and from there the design standards applied to the development of digital technologies. In this sense, data literacy interventions can offer spaces for the development of older people's subjectivities in ways that reflect their unique and diverse experiences of datafication and help them articulate their unique needs and desires.

As Van Dijck et al. (2018) points out, platforms are not just intermediaries, but in this case and in the perception of older people, they truly structure the healthcare system, the type of care it offers, and the sense of well-being it makes possible. The work presented here detected the ontological weight of categories that risk reinforcing existing inequalities and exclusions of older people, as Rosales and Fernández-Ardévol (2020) have discovered. These elements are reminiscent of Dalmer et al.'s (2022) proposal to create a geronto-technological culture that is more diverse and participatory and leaves behind prejudices and stereotypical views of old age and ageing, given their consequences for health care. These factors have implications for digital literacy interventions for older people that require them to foster older people's critical understanding of digital subjectivity in managing their data in the context of contextualised health systems.

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Conflict of Interests

The author declares no conflict of interests.

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Article

The Perception of Older Adults Regarding Socio-Political Issues Disseminated on Social Networks

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Abstract

Research on the relationship between seniors and social networks has focused mainly on the difficulties experienced by this group in accessing the internet. However, it has not examined other aspects such as participation by older adults in socio-political discourse. Although articles have been written on specific topics related to this issue, such studies are not enough. This research aims to analyse the perception of people over 60 years of age regarding the use of social networks as a channel for staying informed and participating in socio-political discourse that takes place on social media. To achieve this objective, four focus groups were conducted in July of 2022. In assessing the results, the transcripts were examined using qualitative-inductive content analysis and reinforced with topic analysis to identify shared perceptions. The co-occurrence evaluation reveals a strong relationship between negative perceptions and concepts such as tension and fake news. Positive perceptions are associated with the ease of interaction with other users and the potential for obtaining information. Differences have also been observed among social networks such as Facebook and WhatsApp, which appear to be the networks of choice for sharing information and opinions on socio-political issues.

Keywords

digital divide; digital inclusion; fake news; seniors; social media; social networks

Issue

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1. Introduction

Citizen participation in matters of public interest is shifting to the digital sphere in which not all social groups are equally represented. In the field of socio-political affairs, which are defined as systems and problems involving a combination of social and political factors (Socio-political, n.d.), the study of how citizens are coping with the digitisation of the socio-political realm is of interest. Given that people over 60 years of age are the population who participate the least on social networks, understanding the factors that either encourage or discourage this age group from using social networks is useful. According to data from IAB Spain (2022), only 21% of Spanish social network users are between 56 and 70 years old. Nevertheless, there is growing interest in social media. This is indicated by the fact

that this segment has experienced the highest rate of growth on Facebook and Instagram (We Are Social & Hootsuite, 2021).

Yet academic studies related to the participation of older adults on social networks are so scarce that the issue is clearly not a priority. In analysing the literature, it has been possible to distinguish among studies that focus on the political participation of older adults, others that refer to their participation in social media, and those that focus on the relationship between seniors and social networks.

With regard to the former, isolated research can be found, most of which is confined to certain geographical areas and specific problems. The following are some of the barriers to political participation by this group that have been observed: the lack of communicative opportunities (Alves Martins et al., 2022), individual experiences,

political structures (Engelman et al., 2022), and educational levels as an outgrowth of schooling received in childhood (Burden et al., 2020).

On the other hand, the advantages of political involvement by seniors have attracted the attention of researchers as well. These studies have revealed that such involvement provides greater security (De Donder et al., 2012); improves social support, status, and recognition (Lühr et al., 2022); and helps shape the identity of older adults (Blanche-T. & Fernández-Ardèvol, 2022). Incentives for involvement in political organisations are linked to the potential for making changes in the community (Serrat & Villar, 2016) and to the opportunity to learn something new and stay active (Ramírez-Correa et al., 2021; Serrat et al., 2017). At the same time, restraints are linked to negative experiences in political involvement (Serrat et al., 2018, 2021) or to equating politics with conflict (Xie & Jaeger, 2008).

Nevertheless, research on seniors' political participation in social media is nearly non-existent. Some studies have revealed that social media offer this segment of the population the opportunity to exchange ideas in a virtual community (Xu, 2022). Furthermore, Miranda et al. (2020) have studied the relationship that Spanish and Portuguese seniors have with social networks, while Miranda-Bustamante (2018) has analysed the digital habits of retired Chileans on Twitter. Finally, Coelho (2022) has identified the factors that influence the use of technology, finding that some older adults explore areas of interest and share their talents, while others use it to express opinions. Regarding the integration of seniors and people with disabilities into the digital society, Llorente-Barroso, Anzanello-Carrascoza, and Ferreira (2023) state that the digital divide resulting from technological innovation and digitisation exacerbates inequality for these groups and further limits their socio-political participation. In this sense, Urbina et al. (2022) consider that social participation requires digital technology, which implies that seniors must have both the material means and the opportunity to use such technology, along with the need to develop a positive attitude toward its use. These same authors concur on the need to support seniors' digital skills in order to enhance their agency and cultural capital in society. On the issue of learning to use technology, especially for seniors and people with disabilities, Schlomann et al. (2022) consider that ICT training in old age should ideally be developed in a modular way so that self-learning formats can be embedded in guided learning units.

Waycott et al. (2019) explore the benefits of technology in building relationships, including personal bonds, community links, and societal engagement. Moreover, they describe how ICT can be designed and used to enrich the three different types of social connection by drawing on examples from the literature on human-computer interaction.

1.1. Motivations and Barriers to Using the Internet and Social Networks

Studies that focus on seniors' participation in social networks without specifying engagement with socio-political content are more prevalent. Research into the relationship between older adults and social networks has focused mainly on the difficulties this group has in accessing the internet (Delello & McWhorter, 2017; Tirado-Morueta et al., 2012). Regarding the benefits of social networks for older people, it appears that using these platforms allows them to improve or maintain social connections (Hsu et al., 2021; O'Brien et al., 2021; Ramírez-Correa et al., 2021; Yu, 2020; Yu et al., 2016, 2018). This has a positive impact on social capital and well-being at older ages (Simons et al., 2021), which helps seniors feel less lonely and isolated (Aarts et al., 2015; Chang et al., 2015; Llorente-Barroso et al., 2021; Zhang et al., 2021). Consequently, social media can contribute to positive ageing, especially in terms of compensating for a lack of in-person interaction (Sheldon et al., 2021). Moreover, engagement among various age groups often encourages seniors to participate in social networks by providing entertainment and collaborative learning (Carenzio et al., 2021; Casanova et al., 2021). Other incentives for using social networks include satisfying curiosity (Wieczorkowski et al., 2020), searching for information (Yu, 2020), and seeking pleasurable experiences (Ramírez-Correa et al., 2019).

In addition, Neves et al. (2018) present case studies of such research and challenge the simplistic notion of an age-based digital divide, by drawing on strong structuration theory to explore the interconnection between agency, structure, and context in the sociotechnical process of adopting technology, as well as in its use and non-use among older adults. Concurring with this approach, other authors indicate neither a consistent pattern in the specific ways seniors use the internet nor a homogeneous level of digital knowledge among this demographic group (Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023; Sánchez Valle et al., 2022; Viñarás-Abad et al., 2022). In this regard, Loos and Ivan (2022) outline the differences between the three technological generations identified in this study: the "mechanical" generation (born in 1938 or before), the "household revolution" generation (born between 1939 and 1948), and the "technological spread" generation (born between 1949 and 1963). Regarding these groups, the authors refer to the use of email, chats, and social networking sites by older people, and they affirm that the expansion of both the availability and access to digital media does not necessarily lead to an increase in use, even among older adults who are further behind in adopting the new media.

Even though a consistent pattern of internet and social media use among older people cannot be established (Loos & Ivan, 2022), the literature on the subject highlights factors that either encourage or discourage

inclusion in the digital sphere. Seniors have reported that the main constraints limiting their use of the internet are a lack of interest (van Deursen & Helsper, 2015), a shortage of digital skills (Quan-Haase et al., 2018; van Deursen & Helsper, 2015), and mistrust (Mason & Pereira, 2011; Quan-Haase et al., 2018; Sánchez Valle et al., 2022; Viñarás-Abad et al., 2022). Other factors include a disdain for technology and a feeling that participation in the digital environment is a waste of time (Mason & Pereira, 2011). Added to these restraints are a zeal for protecting one's privacy and personal data (Elueze & Quan-Haase, 2018; Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023; Sánchez Valle et al., 2022; Viñarás-Abad et al., 2022; Volkmann et al., 2020; Wieczorkowski et al., 2020; Yu et al., 2018), as well as the perception that websites request too much information when making online transactions (Sánchez Valle et al., 2022) or purchases (Viñarás-Abad et al., 2022). Other impediments include a preference for traditional over digital media (Gallistl & Nimrod, 2020; Llorente-Barroso et al., 2021; Vulpe & Crăciun, 2020), a fear of online risk (Elueze & Quan-Haase, 2018), and a lack of skills, which hinder diversified and advanced digital use (Coelho, 2022).

One incentive for using the internet is savings in time and money, yet the most important motivation is venturing into tasks that seniors consider to be safe, such as e-mail, search engines, online banking, and e-commerce, as well as participating in activities related to entertainment and social contact. The most intensive users consider the internet an integral part of their lives and intend to create their own digital footprint (Mason & Pereira, 2011).

Specifically, regarding social network use, some researchers have pointed out negative effects such as anxiety, the loss of in-person interaction, access to inappropriate content, false information (Barroso-Osuna & Aguilar-Gavira, 2015), and a negative portrayal of ageing (Makita et al., 2021). Seniors feel that social media is dull and not enjoyable. Moreover, they are afraid of being unable to protect their privacy, or of becoming addicted to such networks. Other concerns include a lack of time in keeping their profiles up-to-date, as well as not knowing how social networks work (GWI, 2021), especially due to the technical terminology and the uncertainty of using computers (Volkmann et al., 2020). However, a certain percentage of older people find social networks attractive and use them fervently (Gallistl & Nimrod, 2020).

2. Methodology

2.1. Objectives

The aim of this study is to discover the perception of people over 60 regarding the socio-political content developed on social media. The overall objective has been subdivided into the following specific objectives:

- SO1: Identify the positive and negative perceptions of internet users over 60 years of age (whether they use social networks or not), which either limit or promote their socio-political activity in the digital environment.
- SO2: Discover the ways that internet users in this age group use social networks with regard to the socio-political issues addressed.

2.2. Design of the Methodology

To achieve the objectives, we chose to carry out qualitative research through focus groups, which is considered the most appropriate method for gathering perceptions on an issue (Krueger, 1991), as it allows researchers to discover the opinions of a relatively large number of people in a short period of time (Vallés, 1997).

Four focus groups comprised of people over 60 were held during the month of July 2022. As shown in Table 1, 28 seniors took part (16 women and 12 men) between the ages of 61 and 72. The groups consisted of older adults with similar social network behaviour and an interest in socio-political content. Participants were selected by means of a questionnaire that included inquiries about their consumption of news in traditional and digital media, as well as their interest in the socio-political content disseminated in these media. Once the answers were obtained, a selection was made based on those who had stated that they consume news at least once a day in different media, especially on socio-political issues, and who showed an interest in this type of public affairs. Thus, the groups were comprised of the following seniors:

- Group 1: Social network users, three of whom are interested in socio-political content;
- Group 2: Social network users with an interest in socio-political content;
- Group 3: Seniors who do not use social networks;
- Group 4: Social network users with no interest in socio-political content (Table 1).

What differentiates Group 1 from Group 2 is that in the latter, all the participants are interested in the conversations and discussions that take place on social networks regarding socio-political issues. By contrast, only three of the respondents in Group 1 meet this criterion. The research team considered it useful to create a heterogeneous group in order to contrast the opinions of those who have an interest in public affairs on social networks with those who do not.

2.3. Development of the Focus Groups

Before the focus groups were carried out, a set of open-ended questions were developed to guide the conversation and enable uniformity of the questions and procedures in order to compare the results obtained in each

Table 1. Fact sheet of the focus groups.

Items	Group 1	Group 2	Group 3	Group 4
Number of participants	Seven (four women and three men)			
Residence	Madrid	Madrid	Madrid	Madrid
Age	61–72 years	61–70 years	61–71 years	61–67 years
Social network users	Yes	Yes	No (except for WhatsApp)	Yes
Interest in socio-political issues on social networks	Three participants	All participants	N/A	None of the participants
Date conducted	20/07/2022	20/07/2022	21/07/2022	21/07/2022

group (Morgan, 1996). Special care was taken to ensure that the process was exhaustive in order to achieve the objectives of the research, while at the same time allowing the members of the groups to freely express their opinions. The questions were structured around four main topics: experiences and perceptions of seniors regarding the use of social networks in general; experiences, opinions, and perceptions about the participation of people over 60 in socio-political issues through social networks; advantages and disadvantages perceived by those over 60 with regard to socio-political participation in the digital environment; and motivations and restraints to cyber-participation by older adults in social and political issues.

The focus groups were moderated by two members of the research team and lasted about 90 minutes. They were recorded and transcribed to facilitate their analysis, which consisted of finding common points and discrepancies among the participants of the groups (Onwuegbuzie et al., 2009; Vallés, 2002).

2.4. Data Analysis

The data was examined using topic analysis to identify, analyse, and communicate patterns in the data. Afterwards, a data set was organised and described in detail, according to the stages recommended by Braun and Clarke (2006). The first phase consisted of reading the four transcripts to generate the initial codes with open, axial, and selective coding (Strauss & Corbin, 1990), in order to systemise the analysis and avoid coding errors (Sabariego-Puig et al., 2014).

As explained by San Martín (2014), the procedure used for data analysis is based on the application of grounded theory. In this data coding process, there are three distinct stages: open coding, axial coding, and selective coding. The first aims to study the text in order to decipher the concepts, ideas, and meanings. The work is inductive. This coding is the result of a thorough analysis of the data in order to conceptualise the meanings contained in the text. The data are segmented, examined, and compared to find similarities and differences.

The result of this first coding is a list of codes from which a major or second-degree classification is obtained, which is a category. This process is called categorisation and refers to the summarisation of concepts into general concepts. Axial coding is the process of identifying relationships between the categories obtained in open coding and their subcategories and categories that need to be associated, bearing in mind that a category represents a phenomenon or, in other words, a problem, an event, an occurrence, an issue, or an incident that is defined as significant for the interviewee. The next step is selective coding, which is an extension of the previous step, but with a higher level of abstraction. The purpose is to obtain one main category that embodies the research phenomenon and integrates the categories and subcategories of open and axial coding.

Finally, theoretical or content saturation is one of the analytical procedures that ensure explanatory breadth and the identification of broad relationships between categories. In this article, we have managed to collect enough data to saturate all the categories in order to give consistency to the theory and finish the data-gathering process.

ATLAS.ti 9 software was used for this entire procedure, which allows large amounts of data to be processed. According to San Martín (2014), this programme was designed in the late 1980s by German researcher Thomas Murh, who using technology attempted to apply the methodological approaches of Glaser and Strauss. This software makes it possible to convey the circular nature of the qualitative analysis, as it offers the option of sequentially incorporating the data without the need to collect all the data at the same time. For this reason, it enables theoretical sampling, which is necessary for carrying out theory-building analyses. Similarly, ATLAS.ti also allows the identification of those codes that need to be saturated. This is possible thanks to the code-primary-documents-table function, which shows the number of citations that belong to each code. Therefore, this software function enables content saturation to be applied to each code and category, as proposed in grounded theory. Like most software, ATLAS.ti is a text retrieval

programme, yet it is focused on conceptual work in which each step of theoretical coding (open, axial, and selective coding) has a place in the programme. For example, open coding is carried out at the level of segment coding, and axial coding is used to create networks of conceptual relations. As for the selective coding proposed in grounded theory, ATLAS.ti has a “super code” function, which enables the creation of a main category that integrates the codes and categories developed during the open and axial coding phases.

The main topics were identified and converted into 33 codes. Next, a text analysis was carried out in which 478 comments were found. Each of these comments was assigned corresponding codes, which in some cases included more than one. A continuous analysis was carried out to refine the details of each topic and the overall narrative, thereby generating clear concepts. In the first analysis, a code-document table was created to compare the topics discussed in the focus groups. To establish associations between the codes, a co-occurrence analysis was carried out in order to determine relationships of greater intensity between the codes according to the co-occurrence coefficient (COO), which is a number between 0 and 1. This measures the intensity of co-occurrence according to frequency. The closer this coefficient is to 1, the stronger the relationship between the two codes. A semantic map was also created, which allowed the author to graphically observe the relationships between codes according to their level of intensity.

3. Results

3.1. Topics Discussed in the Focus Groups Based on the Code-Document Analysis

Table 2 shows the main topics of conversation in each of the groups. Those who talked most about the negative aspects of social networks were Group 4, comprised of social network users who are not interested in socio-political content, and Group 3, made up of internet navigators who do not use social networks (45 and 39 comments, respectively). Group 3 focused more on the risks of social networks than the other groups (32 comments). However, those who use social networks felt more mistrust toward these channels (15 comments in Group 1). Furthermore, the groups who use social net-

works displayed greater knowledge of the different social networks, as evidenced by the fact that Group 4 mentioned some of them 39 times, compared to 17 mentions by Group 3.

Logically, the groups who use social networks stated having more incentives for doing so (41 comments in Group 1, 43 in Group 2, and 50 in Group 4). At the same time, they talked about the positive aspects of social networks more than Group 3. Moreover, these positive comments were especially prevalent among Group 1 (33 mentions) and Group 4 (34 mentions).

3.2. Analysis of Co-Occurrence Between Codes

To analyse the associations between codes, a co-occurrence analysis was carried out involving all the codes. The main relations between the codes were gathered from this analysis. The most relevant findings are the associations with higher and lower levels of frequency, which were obtained by using the COO as a reference. Thus, associations above a coefficient of 0.50 are considered very high (marked in orange). High associations are those between 0.49 and 0.30 (marked in yellow). Moderate relations are between 0.29 and 0.10, marked in green. Finally, low relations are those with a coefficient of less than 0.9, marked in blue.

Figure 1 shows the connections between the concepts. To make it easier to observe the results, a semantic map was created, in which the codes and their relations are reflected. This preliminary analysis was used to focus on the content of the article, taking into account the strongest associations between the codes that would address the research objectives. Table 3 displays relations that are very high, high, and moderate.

3.2.1. Negative and Positive Perceptions of Social Networks

In Table 4, one can see the codes with which the negative and positive perception codes co-occur and the degree of frequency based on the COO. In addition, the degree of grounding of each of them has been provided as well. Analysis of the data shows that the strongest association with negative perception is the political tension on social networks (COO 0.37). Participants associate tension with a negative perception of social networks.

Table 2. Topics discussed regarding social network use.

	Group 1	Group 2	Group 3	Group 4	Total
Mistrust	15	10	8	7	40
Negative perception of social networks	20	6	39	45	110
Motivation and use of social networks	41	43	14	50	148
Positive perception of social networks	33	17	2	34	86
Comments about social networks	31	38	17	39	125
Risk of social networks	20	9	32	14	75
Total	160	123	112	189	584

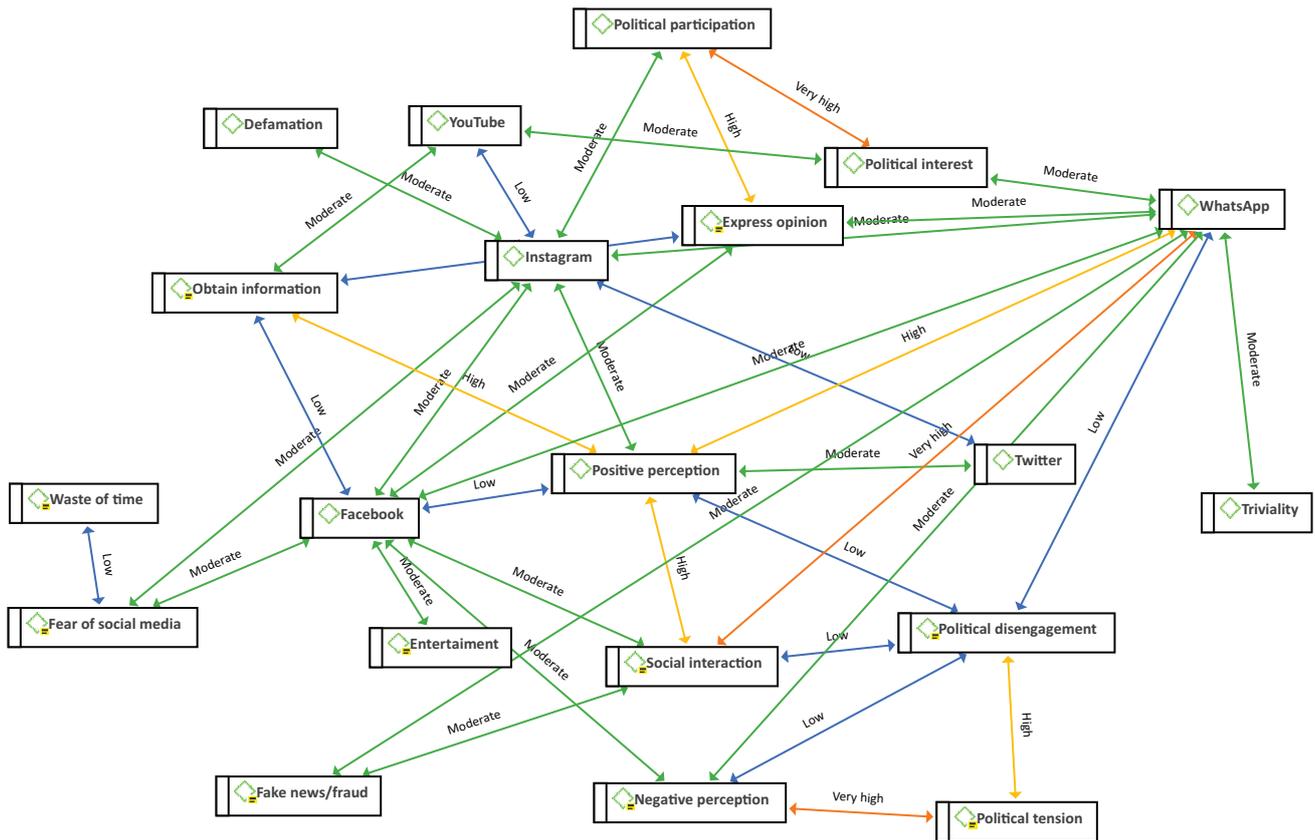


Figure 1. Semantic network of associations between codes.

The same is true for the existence of fake news and fraud on social networks, although the frequency, in this case, is lower (0.25).

The WhatsApp code (0.12) and that of Facebook (0.14) also co-occur when talking about negative perceptions, yet with less frequency than when participants express their opinion about social networks, as seen in Table 4.

This occurs primarily because participants identify fake news and fraud with these social networks. Other associations that are less intense are the feeling that social networks are a waste of time and the lack of interaction and physical contact provided by social networks.

Positive perceptions of social networks are strongly associated with the opportunity to obtain information

Table 3. Co-occurrences with very high, high, and moderate frequency.

Associated codes	COO	Frequency
Political participation and political interest	0.69	Very high
Political tension and negative perception	0.51	Very high
WhatsApp and social interaction	0.50	Very high
WhatsApp and a positive perception of social networks	0.47	High
Social interaction and a positive perception of social networks	0.42	High
Expressing opinion and political participation	0.41	High
Obtaining information and a positive perception of social networks	0.40	High
Political disengagement and political tension	0.40	High
Facebook and a positive perception of social networks	0.26	Moderate
Fake news and a negative perception	0.25	Moderate
Perceiving social networks as a waste of time, and a fear of social networks	0.23	Moderate
Facebook and obtaining information	0.23	Moderate
Instagram and YouTube	0.22	Moderate
Twitter and Instagram	0.21	Moderate
Obtaining information and expressing opinion	0.21	Moderate

Table 4. Co-occurrences between negative and positive perception codes, including the rest of the codes.

	Negative perception		Positive perception	
	Count	Coefficient	Count	Coefficient
Defamation	4	0.04	—	—
Entertainment	1	0.01	13	0.15
Expressing opinion	1	0.01	14	0.14
Facebook	20	0.14	1	0.01
Fake news/fraud	23	0.25	1	0.01
Fear of social media	13	0.12	2	0.02
Feeling that social networks are a waste of time	12	0.12	3	0.03
Instagram	5	0.05	6	0.06
Lack of interaction	10	0.10	1	0.01
LinkedIn	1	0.01	2	0.02
Low level of instruction in using social networks	4	0.04	—	—
Mistrust	10	0.08	1	0.01
Negative perception	—	—	7	0.04
Obtaining information	2	0.01	41	0.40
Pandemic	7	0.07	8	0.09
Political disengagement	4	0.04	1	0.01
Political interest	—	—	8	0.09
Political participation	—	—	14	0.16
Political tension	42	0.37	3	0.02
Positive perception	7	0.04	—	—
Social interaction	12	0.08	43	0.42
Triviality	7	0.07	—	—
Twitter	9	0.08	17	0.18
WhatsApp	18	0.12	49	0.47
YouTube	—	—	8	0.09

(0.40), social interaction (0.42), and the belief that WhatsApp is the most widely used application. This tool has been identified by participants as the one that provides the highest level of interaction and information for staying informed. Although with lower COOs, the following codes display a positive perception of social networks: entertainment (0.15), the opportunity to express one's opinion (0.14), and the option of participating in political conversation (0.16). Moreover, Facebook (0.26), Twitter (0.18), Instagram (0.06), and YouTube (0.09) also show positive associations.

3.2.2. Political Participation

Political tension on social media is the main reason for not actively engaging in political participation (0.40). In the focus groups, participants stated doing little or nothing on social networks regarding controversial issues in order to avoid conflict with people close to them as well as strangers.

On the other hand, political participation is strongly associated with expressing an opinion on socio-political issues (0.41). It also has a very strong relation with

seniors' interest in socio-political issues (0.69). Political participation is also associated with obtaining information for staying informed (0.16). The social networks most strongly associated with political participation are Facebook (0.14), WhatsApp (0.16), and to a lesser extent Instagram (0.11), YouTube (0.09), and Twitter (0.05; see Table 5).

3.2.3. The Use of Social Networks for Socio-Political Issues

During the data analysis, it seemed useful to reflect on the association between codes that describe the uses made of social networks. It has been observed that the strongest association exists between WhatsApp and social interaction (COO 0.53), whereas Facebook has moderate relations with the four codes describing the uses of social networks. It appears that the opportunity to obtain information through social networks interacts moderately with all social networks except Instagram, which does not seem to be related to the entertainment aspect. Moreover, Instagram has weak connections to the rest of the uses as well. As commented above, there

Table 5. Co-occurrences between political participation and political disengagement codes, including the rest of the codes.

	Political participation		Political disengagement	
	Count	Coefficient	Count	Coefficient
Expressing opinion	14	0.41	—	—
Facebook	10	0.14	—	—
Instagram	3	0.11	—	—
Negative perception	—	—	4	0.04
Obtaining information	10	0.16	—	—
Political interest	11	0.69	—	—
Political tension	—	—	23	0.40
Positive perception	14	0.16	1	0.01
Social interaction	10	0.15	1	0.01
Twitter	2	0.05	—	—
WhatsApp	12	0.16	1	0.01
YouTube	2	0.09	—	—

is a strong association between WhatsApp and social interaction (see Table 6).

4. Discussion and Conclusions

Analysis of the focus groups reveals that a certain type of senior, namely one who is concerned with socio-political issues, has enough interest in order to participate in conversations on social media regarding such matters. At the same time, other seniors shy away from conversations on these issues in order to avoid conflict with social media users (Xie & Jaeger, 2008). It is clear that everyone is aware of the risks involved in being present on social media, especially those who are not social media users. On the other hand, the focus group participants clearly state the reasons why they feel encouraged to become involved in this digital environment, although they also reveal barriers and restraints that are more frequently mentioned among non-users of social networks.

In response to SO1, the discourse of participants shows that the perception of social networks is related to the personality and cognitive factors of seniors, according to Barranquero and Barbas (2022), and their level of interest in politics. Moreover, these cognitive factors are

related to the perception and knowledge that users have about social networks. The findings of this study coincide with those obtained by other researchers regarding the fact that social networks make it possible for older people to connect with both relatives and strangers (Hsu et al., 2021; O'Brien et al., 2021; Ramírez-Correa et al., 2021; Yu, 2020; Yu et al., 2016, 2018;), thereby reducing the negative effects of social isolation and loneliness (Chang et al., 2015; Llorente-Barroso et al., 2021). In addition to these findings, the main contribution of this study is that in the case of socio-political participation on social media, the perceived tension in discussing such issues, as well as the presence of fake news and fraud, become a source of discomfort that hinders the involvement of seniors. In terms of incentives, it has been shown that a positive aspect of social media is the opportunity it provides to express opinions on socio-political issues.

The restraints identified in other research have been confirmed in the present study, such as anxiety and the fear of risks associated with using the internet (Elueze & Quan-Haase, 2018), exposure to inappropriate content or fake news (Barroso-Osuna & Aguilar-Gavira, 2015), the fear of becoming addicted to social networks, and/or the lack of time to keep personal profiles updated (GWI,

Table 6. Co-occurrences between entertainment, obtaining information, expressing opinion, and social interaction, including the codes of social media.

	Entertainment coefficient	Expressing opinion coefficient	Obtaining information coefficient	Social interaction coefficient
Facebook	0.10	0.19	0.23	0.14
Instagram	—	0.05	0.09	0.03
LinkedIn	—	—	—	0.05
Twitter	0.00	0.07	0.21	0.01
WhatsApp	0.00	0.11	0.18	0.53
YouTube	0.00	0.08	0.14	0.02

2021; Mason & Pereira, 2011). Other reasons why older adults make scarce use of these digital spaces are a low level of digital skill (Coelho, 2022; Quan-Haase et al., 2018; van Deursen & Helsper, 2015) and the perceived risk of sharing their personal data (Elueze & Quan-Haase, 2018; Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023; Sánchez Valle et al., 2022; Viñarás-Abad et al., 2022; Volkmann et al., 2020; Wiczorkowski et al., 2020; Yu et al., 2018). Other factors include a lack of interest (van Deursen & Helsper, 2015) and general mistrust (Mason & Pereira, 2011; Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023; Quan-Haase et al., 2018; Sánchez Valle et al., 2022; Viñarás-Abad et al., 2022).

Regarding SO2, social networks are perceived positively, mainly because they allow seniors to obtain information, interact socially, and express their opinions on socio-political issues. Perceptions regarding the positive aspects of social media are strongly associated with the WhatsApp tool. Facebook has moderate links with the four main uses of social networks, compared to Twitter, WhatsApp, and YouTube, which only have links to obtaining information. There is no association between entertainment and social media, with the exception of Facebook, as mentioned above. It is striking that Instagram is not the most mentioned network when referring to the usefulness of social networks, especially for entertainment. These findings are probably due to the fact that seniors use Facebook and WhatsApp more than other social media (IAB Spain, 2022). The uses made of social networks coincide with the opportunities generally offered by the internet for obtaining information to stay informed, communicating, expressing opinions, and being entertained (Llorente-Barroso et al., 2015). The limitations experienced by seniors in participating in the digital environment have been mentioned above and reinforced by previous studies as well. Nevertheless, the main contribution of the present research is that it points out two restraints that limit the “cyber-participation” of seniors in socio-political issues: the prevailing tension in political discourse and the fear of being a victim of fraud or being misled by fake news. However, the ease of interaction among users is an incentive for continued engagement in the digital world (GWI, 2021; Miranda et al., 2020), despite the risk and mistrust involved. In this regard, it would be of interest to implement digital literacy strategies aimed at this group in order to promote their inclusion in the social realm (Abad Alcalá, 2017). In this way, they would not be left out of debates on issues that affect them directly or indirectly as members of society.

Despite the limitations of this study as a result of the methodology itself, this article offers additional knowledge regarding a crucial issue for modern societies, which is the fact that being part of the digital society is no longer an option. Instead, it is a requirement in order for people to be fully engaged in social, economic, and civic life (Allmann & Blank, 2021).

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Conflict of Interests

The author declares no conflict of interests.

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