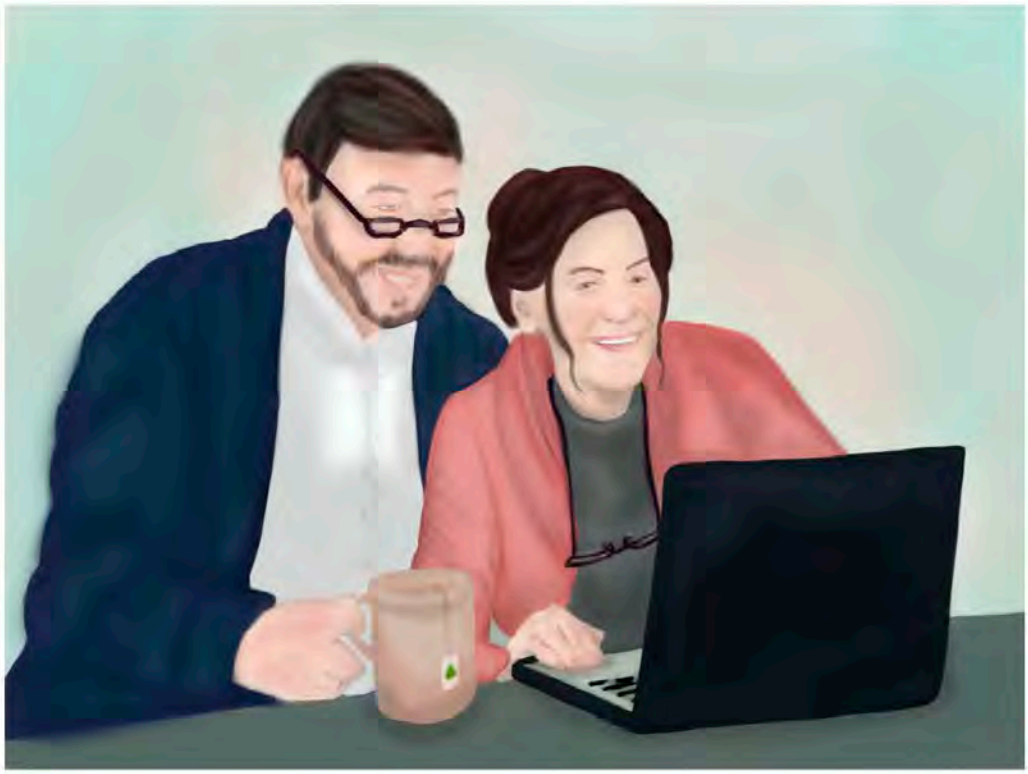
Networking Knowledge

Volume 10 Issue 1 March 2017



Ageing in a Network Society

Edited by

Liliana Vale Costa and Hannah Grist

Networking Knowledge 10(1)

Special Issue

Ageing in a Network Society

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Ageing in a network society: An Introduction

LILIANA VALE COSTA, *University of Aveiro*
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Welcome to the special issue 'Ageing in a network society' of *Networking Knowledge*.

With the rapid advancements in digital platforms and the emergence of new trends, greater challenges have been posed by both an increasingly global and network society, demographic challenges and changes in the labour workforce and in the complexity of social interactions (Bond, Peace, Dittmann-Kohli, & Westerhof 2007; Bowling 2005). In the UK alone, projections suggest that the number of older people in society will have nearly doubled to 19 million by 2050.[1]

Whilst we have been aware of the main advantages and barriers posed by the introduction of new media over time (Castells 2001), challenges such as intergenerational gaps in the access to information that may affect learning, communication and authority roles, social digital divides, accessibility and difficulty in accessing daily-living services are likely to persist (Costa, & Veloso 2016; Fisk, Rogers, Charness, et al. 2009; Sixsmith & Gutman 2013).

Information and Communication Technologies can play a crucial role in strengthening age identity and encouraging prosocial behaviours, sense of social connectedness and of purposefulness (Costa 2013; Cabrera, & Malanowski 2009; De Schutter & Vanden Abeele 2008; Felsted, & Wright 2014). By exploring the older adults' needs and their context, their media appropriation, usability and accessibility issues and the development of easy-to-use services and ICT-based products, the papers in this special issue highlight the complexity of the relationship between older adults and the network society in which we live.

Hence, this special issue aims to explore the role of ICTs in encouraging the development of networked older adults. Specifically, the following papers give a noteworthy contribution to the challenges posed by an increasingly ageing and networked society. This special issue is edited by colleagues whose disciplines are not naturally symbiotic – one from Information and Communication studies and the other from Ageing studies. As such, this special issue posed an interesting set of challenges for the editors as they explored their shared understandings of what it means to grow old or be old in a network society. The editors would therefore like to thank the authors for their receptiveness to ageing studies theory and for challenging their own assumptions about what it means to be old. This special issue acts, in some ways, as a stepping stone or a bridge between more information technological based notions of what it is to grow older and cultural gerontological constructions of older age.

[1] www.parliament.uk

The Collection

In "Jumping the digital divide: How do silver surfers and digital immigrants use social media?," Kaja Fietkiwicz discusses the use of different social media services by different generations – "the silver surfers" (individuals born in the 30s and 40s), "the digital immigrants" (individuals born in the 60s and 70s), "digital natives" (individuals born in the 80s and 90s) and "younger generations" (individuals born in the 90s and millennials).

In "The Elderly's Media Appropriation as Variable for Target Groups", Rebeka Haubold and Sonja Guanguin identify a set of classification categories for older adults by means of media appropriation. Supported by their experience in the intergenerational volunteering group of the GAM e.V. (Gesellschaft Alter(n) Medien e.V.) - The 'Medienclub Leipziger Löwen' (Media-Club Leipzig's Lions), they give an important insight into the concept of media appropriation with regards to older adults and its main implications for media practitioners.

In "Older Adults and Email Use: interface redesign's challenges," Sónia Ferreira, Óscar Mealha and Ana Isabel Veloso present the results of a cross-country research carried out under the Project SEDUCE ("Senior Citizen Use of Computer-Mediated Communication in Web Ecologies") in order to determine to what extent the participation of older adults in the development of an email service could influence its usability and to design a simplified interface for this service.

In "Seniors, iTV and content about Social Services: clarifying the relationship," Telmo Silva and Mariana Carlos propose a set of principles for the development of social services for iTV, taking into account its potential and the limitations of older adult viewers.

Similarly, in "Communicating Public and Social Services through iTv: a user-centred approach," David Campelo, Jorge de Abreu and Telmo Silva describe the implementation of an iTV system dedicated to the older adult population.

Finally, we would like to thank you, the authors and readers, who contributed to this Special Issue. Our acknowledgment is also extended to the following external reviewers for their time and effort:

Editors

Liliana Vale Costa – University of Aveiro, Portugal
Hannah Grist – University of Gloucestershire, United Kingdom

Reviewers

Andréa Poshar, Politecnico di Milano, Italy;
Anne Fédé - L'École Nationale des Ponts et Chaussées, France;
Elena De Sacco - University of Liverpool, United Kingdom;
Feyza Akinerdem - Istanbul Şehir University, Turkey;

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Jumping the digital divide: How do "silver surfers" and "digital immigrants" use social media?

KAJA FIETKIEWICZ, *Heinrich-Heine-University Düsseldorf*

ABSTRACT

For a long time, a digital divide was given between young Web users and older population, which out of anxiety or incapability restrained from using the new technologies. Recently, the so-called "Silver Surfers" and "Digital Immigrants" tend to use the Web not only for sending emails but also increasingly for socializing on social media services (e.g., Kübler 2009; Frees & Koch 2015). This paper aims to discuss the differences in use and adoption of social media platforms between different generations. An online questionnaire was created and distributed among social media users of all ages. The results indicate that the older generations represented a not insignificant part of social media community. They often use Facebook to keep in touch with friends and family, some apply Twitter and are fond of new followers and many re-tweets, and others just enjoy new videos on YouTube. There indeed appear to exist inter-generational differences in social media usage. In addition, data analysis leads to the conclusion that there are intra-generational gender-dependent particularities as well.

KEYWORDS
ageing, social Media use, "silver surfers", "digital immigrants", "digital natives"

Introduction

The rapid changes in technology and extensive digitalization laid a foundation for broad research on the so-called digital divide, i.e., the individual's (specific groups or entire societies') lacking facility or lacking skills to make use of this new advancement. In general, we can distinguish different types of divisions: (a) the global divide between industrialised and developing countries based on the Internet access; (b) the social divide between the "information rich" and "information poor" within a nation; and (c) the democratic divide between people who choose to use digital resources and the ones who do not (Choudrie, Grey & Tsitsianis 2010; Norris 2001). Indeed, the focus lies in the skills and adaptation rather than the physical access. The questions that arise are: 'In what ways can we make the technology usable and accessible, especially for older people, who are labelled as "Digital Immigrants" (Prensky 2001), with the purpose of bridging the gap between different generations?' and 'What happens after the digital divide is actually overcome by some individuals from this generation, who now regularly surf the Web?'

Social media services have taken human interaction to the next level. The exchange between users and their communication is almost as real as in the analogue world. The focus of current research lies primarily on younger users already growing up with (mobile) Internet, Facebook and Google, the so-called "Digital Natives" (Prensky 2001). Their (presumed, but not really verified) highly developed information literacy often comes with the cost of actual social interaction without the Internet as an intermediary. Apparently, they are always online and have nothing to hide; some are (becoming) narcissists, whose social media profiles do not really reflect their real lives and personalities (Bergman et al. 2011; Carpenter 2012; Ong et al. 2011). In this research, we turn from these 'Digital Natives' and take a closer look at the 'Digital Immigrants', especially the so-called 'Silver Surfers' (born before the 1960s). These populations grew up without the Internet and faced the rapid development of new technologies in their teenage and adult lives. Some of them did not bypass the digital divide—either because of the lacking information literacy, maybe out of fear, or just out of scepticism (Smith 2014). However, more and more Internet users over 50 do not only use the Internet in everyday life, but even sign on to a number of social media services, which initially appeared to be rather a domain for the teenage surfers and young adults (see figure 1).

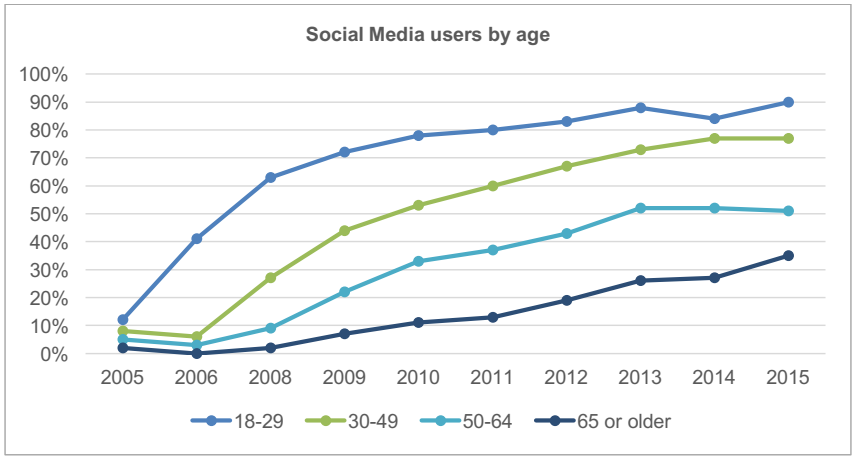

Figure 1 Social Media users in the USA by age since 2015. Source: Perrin 2015.

The current study is based on a survey conducted among social media users. An online questionnaire was designed to investigate: 1) the use of different social media services; 2) the frequency of social media use; and 3) the motivation for using social media, all for diverse age groups and additionally differentiated by gender. Overall, the results highlight the different uses of social media amongst 'Silver Surfers' (those born between the 1930s to 1950s) and 'Digital Immigrants' (1960s and 1970s), and offer an area for comparison with the usage by the 'Digital Natives' (the so-called 'Generation Y', 1980s and 1990s) and the youngest generation sampled (those born in the mid to late 1990s, also called 'Gen Z' or 'Generation C' or the 'Millennial Generation'). The

focus of this study lies in the following social media services: Facebook, Twitter, Instagram, and YouTube. For some interviewees, the digital divide is already in the past as social media like Facebook or YouTube appear to be very popular in all age groups, including the 'Silver Surfers'. Interestingly, Twitter is more popular among the older Web users rather than the younger generations, who prefer Instagram. Further outcomes from this study show differences between investigated age groups regarding the motivation for applying social media and their expectations from them, as well as the gender-dependent differences in social media usage frequency.

Age as a dividing factor

The Internet and other technological innovations replace, or at least complement the traditional means of human interaction (Killian, Hennings & Langner 2012). However, not everyone keeps up with the newest trends. Some groups of people, or even whole countries, are "marginalized from these benefits and are regarded as being digitally divided or excluded" (Choudrie, Ghinea & Songonuga 2013, 419). In the 90s, the digital divide was characterized as a gap in technology access that led to inequalities in "educational, economic, social and civic opportunities among sectors of the population" (NECRL 2012, 17). The access to the Internet alone does not necessarily have to be enough to ensure bridging the divide. In particular, the access itself is not beneficial when the individual is not computer literate or simply hesitates to use it (Choudrie, Ghinea & Songonuga 2013, 419). One of the decisive aspects influencing the willingness to use the Web and its applications is the usability, "an important factor for the quality of web-based projects" (Choudrie, Ghinea & Songonuga 2013, 420). Further conditions fostering the acceptance of new technologies are the perceived ease of use as well as perceived usefulness of the services (Davis 1989).

The access to the Internet is thus only the first step necessary to bridge the divide. Equally important are "the readiness of individuals to use technology, communication networks, and information efficiently, effectively, and productively" (NECRL 2012, 7) and the individuals' motivation to use an Internet service (Linde & Stock 2011). Recent surveys have shown a growth in accessibility and usage of the Internet by people of all ages, including older adults, until now rather excluded from web communities (Statista 2016; Choudrie, Ghinea & Songonuga 2013, 419). Thus, as opposed to stereotypes of older people being unable to adapt to the technological changes, "many seniors have embraced the Internet revolution" (Wood 2003; Choudrie, Ghinea & Songonuga 2013, 418). The older group that does take advantage of the new technology have been labelled 'Silver Surfers' (Choudrie, Ghinea & Songonuga 2013, 418). The market segment for 'Silver Surfers', also referred to as "grey netters", is called the "grey market" (Graeupl 2006, 238).

'Silver Surfers' are Internet users aged 50 and older (Bitterman & Shalev 2004; Oppenauer 2009; Stallman 2012). According to Kübler, they can navigate through the Internet, send and read emails, some of them also share pictures via the Internet, partici-

pate in chat rooms and forums, or do online shopping, online banking and information retrieval (Kübler 2009, 105f.; Stallmann 2012, 218). Frees and Koch (2015) sum up the results of an online study conducted by ARD/ZDF in Germany in 2015, which showed that there are considerable changes in the Internet usage among older people—especially considering the user behaviour of 70-year-olds. There is a notable increase of daily usage in this age group (by 0.8 million people, which constitutes 44%). When comparing the age structure of the Web community with the general population, the most daily active user groups are the ones aged 20-29 and 40-49. However, the biggest age groups within the general population are the 40-49 and 50-59 year-olds, so the biggest growth potential for Internet usage is given for the silver surfers (Frees & Koch 2015, 366).

Regarding the situation in Germany, the significance of the Internet is rising, also among the users over 60 years old. Around 26% of over 60-year-old people access the Web daily (Frees & Koch 2015, 370). In terms of their online activities, communication with other people via the Internet is mostly limited to sending and receiving e-mails (around 73% do it at least once a week). Only 15% of them use instant messaging services (like WhatsApp) regularly, and 11% visit a social network service at least once a week. According to Frees and Koch (2015, 373), micro-blogging services like Twitter or picture sharing websites are not as popular amongst older adult users.

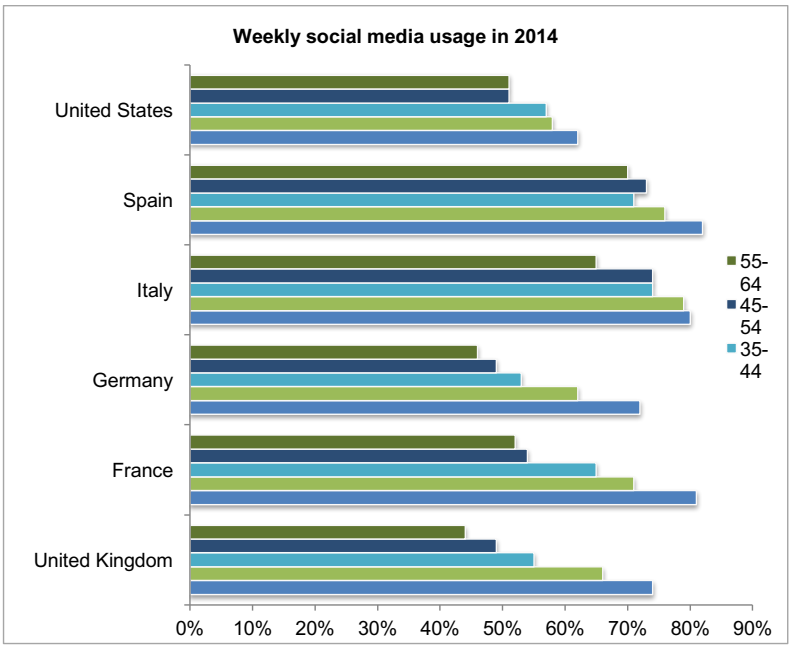

Figure 2 Weekly social media site access in selected countries as of October 2014, by age group. Source: Statista 2016.

According to Statista (2016), the social media usage is lower in older age groups, when comparing with other age groups. As we can see in figure 2, in the investigated countries (Spain, Italy, Germany, UK, France, and the USA), the most active social media users are the ones aged between 18-24, followed by those aged between 25 and 34. The third most active group is the one of 35-44–year-olds, except for Spain, where the 45-54-year-olds are more represented. The oldest group of 55-64-year-olds constitutes the smallest community of social media users in all the investigated countries. The smallest share of active social media users from the group of 55+ is given in the UK (44%) and Germany (46%), followed by the USA (51%) and France (52%). Italy and Spain exhibit higher shares of silver surfers active on social media platforms—65% and 70%, respectively.

Given that the access to the Internet is socioeconomically ensured in those countries, the differences between younger and older generations considering social media usage can be explained either with lacking suitable accessibility and/or usability of the contents and services for older adults, or simply with different information behaviour. Due to the aging process, the human motor functions, sensor and cognitive skills, may be impaired, leading to problems with usage of the new technologies (Oppenauer 2009, 39). Hence, with the increasing share of older social media users, the accessibility and usability of the contents have to be ensured. Further steps are the detection of the information seeking and production behaviour, or the motivation to use certain social media services by different age groups, also partially covered by this study. The conducted comparison of social media usage in this investigation is based on inter-generational differences—between the so-called 'Digital Immigrants', 'Digital Natives', as well as the youngest generation often called 'Gen Z.' In the following section, theories on defining and classification of the different generations will be presented.

The different generations

The new technologies could be seen as a divide between younger and older generations. For the former, it is much easier to learn how to adopt the newest trends, one of them being social media services. Generations growing up with the new communication technologies rely to a great extent on their mobile devices and the Web in order to cultivate their social contacts, as well as for educational or professional purposes (Salajan, Schönwetter & Cleghorn 2010). This dependence, and in some cases even problematic social media use (Cabral 2011) differs from the older generation's attitude towards digitalization, whose members partially integrated the new media in the later or more advanced stages of their lives (Fietkiewicz et al. 2016). It stands to reason, therefore, that different generations have different motivations for using social media as well as a different manner of doing so.

Generations, or generational cohorts, are created around shared experiences or events "interpreted through a common lens based on life stage," rather than being based on social class and geography (Bolton et al. 2013; Mannheim 1952; Sessa et al. 2007;

Simirenko 1966). According to Tapscott (1998), the generations should be categorized as the 'Baby Boomers' (born between 1946 and 1964), 'Baby Busters' (between 1965 and 1976, also called 'Generation X'), and 'Echo Boomers' (also called 'Net Generation', 'Generation Y', or 'Millennials'; born between 1977 and 1997), which can be best described as the "first generation bathed in bits" (Leung 2013; Tapscott 2009). Freestone and Mitchell (2004) describe the cohorts as 'Matures' (1929-1945), 'Baby Boomers' (1946-1964), 'Generation X' (1965-1976), and 'Generation Y' (1977-1993). McIntosh et al. (2007) pursued a little different categorization: 'Silent Generation' (pre WWII), 'Baby Boomer generation' (1946-1962), 'Generation X' (1963-1977), and 'Generation Y' (1978-1986).

All in all, there are more or less congruent definitions of the generational cohorts. In our focus lie the differences between the 'Digital Immigrants' and 'Digital Natives'. Digital Immigrants or Generation X "grew up in an information and technology revolution affecting entertainment, communications, education, and home life" (McIntosh-Elkins, McRitchie & Scoones 2007, 240). According to McIntosh-Elkins, McRitchie and Scoones (2007, 242), this is a generation of cynicism and scepticism, the "Gen Xers are pragmatic," they are "flexible adaptable, and have lived a life of changes." This generation has witnessed great technological advances and was the first one to experience home computers.

Prensky (2001) made a clear distinction between 'Digital Immigrants' and the 'Digital Natives.' He explained that Digital Immigrants learn to adapt to their environment; however, they "still retain some degree of their accent" (Prensky 2001, 3). This Digital Immigrant "accent" is certain information behaviour that cannot be identified among Digital Natives, for example, "turning to the Internet for information second rather than first, or in reading the manual for a program rather than assuming that the program itself will teach us to use it". Other examples of this "accent" include printing out emails, or needing to print out a document written on the computer in order to edit it. There are many factors that differentiate the information behaviour, and possibly the usage of social media, by the 'Digital Immigrants' from the 'Digital Natives', who speak this new language fluently.

The main objective of this study is, therefore, the investigation of differences in social media use between the Digital Natives and the Digital Immigrants or even older generations (i.e Which social media channels do they prefer? How often do they used them? Which aspects are most important for them while applying these platforms? Is it important to stay in touch with friends and family, or is it more in their favour to share own content? Are they concerned with data privacy?). The aforementioned questions could be answered with the help of an online questionnaire distributed within the social media community, specified in the following methods paragraph.

Methods

The online questionnaire created for this study was distributed through different online channels (e.g., Facebook, Twitter, Instagram, or diverse online forums) as well as "offline" through word-of-mouth advertising. There were two language versions of this questionnaire — English and German. The questionnaire featured questions about the popular social network services Facebook, Google+, Twitter and Instagram, as well as the business social network services LinkedIn and Xing. In addition, participants were asked about further photo and video sharing services like Flickr, Pinterest, Tumblr and YouTube. The typical consumer communication services like WhatsApp, Skype, Viber, or LINE were not included. The scope of the study had to be limited to a set of social media channels, otherwise there would be too many question leading to higher break-off rates of the participants. Usage of communication tools like Skype or WhatsApp is, however, an interesting topic for further investigations.

Studies of online population, like in this case the social media users, have led to an increase in the use of online surveys (Wright 2005). There are many advantages of online surveys, including access to individuals from distant locations, automated data collection and analysis (Wright 2005) as well as flexibility for the respondents to answer the question when and where they want to, question diversity, control of question order, and required completion of answers (Evans & Mathur 2005). Even though the internet penetration is greater in industrialized countries and, therefore, in some regions the potential for online surveys is greater (Evans & Mathur 2005), this problem does not affect the recruiting of social media users, since social media use itself requires access to the Web.

For this study the nonprobability sampling was applied, in form of purposive or judgment sampling (social media users), continued as snowball sampling (sharing on social media by participants). Judgment sampling is one of the most common sample techniques, where the researcher actively selects the most productive sample to answer the research question, whereas the subjects may recommend useful potential candidates for study (Marshall 1996). Since this is an exploratory study on potentially limitless population, which makes it difficult to pursue probability sample, no statistical generalization is possible. However, in this case, an analytical analysis can be pursued. One problem of online surveys in general is the self-selection bias, since in any given internet community there are some individuals, who are more likely to complete an online survey (Wright 2005). This leads to limited ability to estimate populations, however, for this study the nonprobability sampling was applied.

Facebook seems to be one of many convenient tools for recruitment of participants (Ramo & Prochaska 2012). Also, thanks to distribution of the survey link through channels like forums or chatrooms, it was possible to reach older web users. According to Wright (2005), researchers can find a concentrated number of older individuals who use computers in the Internet-based community SeniorNet. In contrast, with traditional survey research methods, it may be more difficult to reach a large number of older people

who are interested in computers.

Some disadvantages of online surveys are the tendency that it can be perceived as junk mail, especially when distributed via mailing lists, the skewed attributes of internet population, privacy and security issues (Evans & Mathur 2005). Unwanted emails, security and privacy, are seen as the most problematic ethical issues when conducting online survey (Cho & LaRose 1999). According to Cho and LaRose (1999), the so-called informational and psychological privacy are most sensitive and mostly jeopardized by online surveys. The psychological privacy concerns the content of the information and the degree to which it betrays the psychological or emotional state of the participant. However, the danger of violating psychological privacy is mostly given by surveys dealing with very sensitive topics (which is not the case in current study). The information privacy concerns the desire to control the movement of personal information. Volunteer samples using anonymous replies through webpages, as conducted for this investigation, mostly maintain all four forms of privacy (apart from the informational and psychological, the physical and interactional privacy). The promotion of the survey through different channels could be seen as mild violation of physical privacy, however, it is not as severe as receipt of unsolicited email (Cho & LaRose 1999).

In the questionnaire, 3 types of questions were formulated. The first one was a polar question about the use of a certain service, e.g., 'Do you use Facebook?' Dependent on the answer, two follow-up questions about the concerned service succeeded—about the frequency with which the service is used (e.g., 'How often do you use Facebook?') and about the motivation for using the service (e.g., 'In reference to Facebook, it is important to me that…'). The inquiry about the motivation was adjusted to each service and included three sub-questions, for example, in case of Facebook, 'It is important to me that (i) I have a lot of friends, (ii) I get a lot of "likes", (iii) my personal data is treated as confidential.' The answers for frequency of usage and motivation questions could be marked on a 7-point Likert scale, where "1" meant fully disagree (or in case of frequency — "almost never") and "7" meant fully agree (or "I am always online"). Technically, the quasi interval characteristics of the Likert scale render it appropriate for hypothesis testing of mean responses and cluster approaches. This procedure is a common practice for a scale, since numerical values are assigned to the response categories and, thus, modelling equidistant intervals (Ary et al. 2009). The socio-demographic questions regarded gender, year of birth, country, and education.

The data gathered was statistically analysed. The first part of the investigation regarded the social media usage by the oldest generations that participated in the survey—born between the 1930s and the 1970s. Afterwards, the differences between the Digital Immigrants, Digital Natives and the youngest generation, Gen Z, were analysed. In what follows below, we have included analyses of average social media use frequencies and the probabilities of using certain services, as well as two-sided t-tests for the three generations. The t-tests assess whether the mean of a certain generation is statistically different from other generations. For instance, the differences of the means (of usage fre-

quency or importance of certain motivational aspects) between 'Digital Immigrants' and the pooled observations for 'Digital Natives' and 'Gen Z'. Finally, intra-generational gender-dependent differences are included for the three generations (regarding the probability and frequency of social media usage in relation to gender).

Results

From total 430 participants, 372 completed the study (112 were male, and 260 female). Table 1 presents the general characteristics of the participants. Most of them were from Germany (nearly 60%), followed by Poland (21%), Switzerland and the USA (each 4%). Most of the participants were university students (35.3%) followed by school students (22.3%) and graduates with Bachelor's (17.5%) and Master's degree (17%). Among the participants, Facebook and YouTube are the most popular platforms (92.5% and 86% respectively). Instagram and Twitter seem to be less common, but still adopted by total 37.6% and 29.3% respectively. Pinterest is applied by 13.2% of the respondents.

As table 2 highlights, most of the participants are Digital Natives born between 1980 and 1996 (total 221). The second biggest generational cohort was the youngest one—Gen Z born after 1996 (total 90 participants). Digital Immigrants, born between 1960 and 1980, are represented by 47 test subjects.

General characteristics	
Gender	
male	30.1%
female	69.9%
Age in years (mean)	28.4
Education	
still at school	22.3%
student	35.3%
Bachelor's degree	17.5%
Master's degree	17%
Doctoral degree	4.9%
Country	
Germany	59.9%
Poland	21%
Switzerland	4%
USA	4%
Austria	1.1%
Social media users	
Facebook	92.5%
YouTube	86%
Instagram	37.6%
Twitter	29.3%
Pinterest	13.2%

Table 1 Demographic and social media use characteristic of participants who completed the survey (N=372)

	Year of birth	Subjects
Decade-wise aggregation for older generations	1930s	1
	1940s	2
	1950s	9
	1960s	18
	1970s	29
Digital Immigrants/Gen X	1960-1979	47
Digital Natives/Gen Y	1980-1995	221
Gen Z	since 1996	90

Table 2 Distribution of the participants by age

Firstly, probable differences in social media use between 'Silver Surfers', 'Baby Boomers' and younger generations will be analysed. However, there is no distinction between the generational cohorts as the older participants are grouped by year of birth decade-wise (from 1930s to 1970s). This should give us an impression on probable social media use by 'Silver Surfers' when these 'generations' are thus grouped together. Next, this paper focuses on exploring the differences between 'Digital Immigrants (Gen X)', 'Digital Natives (Gen Y)' and the youngest generation (Gen Z). These outcomes are more significant and give a more accurate picture of inter-generational differences, since the investigated sample was larger.

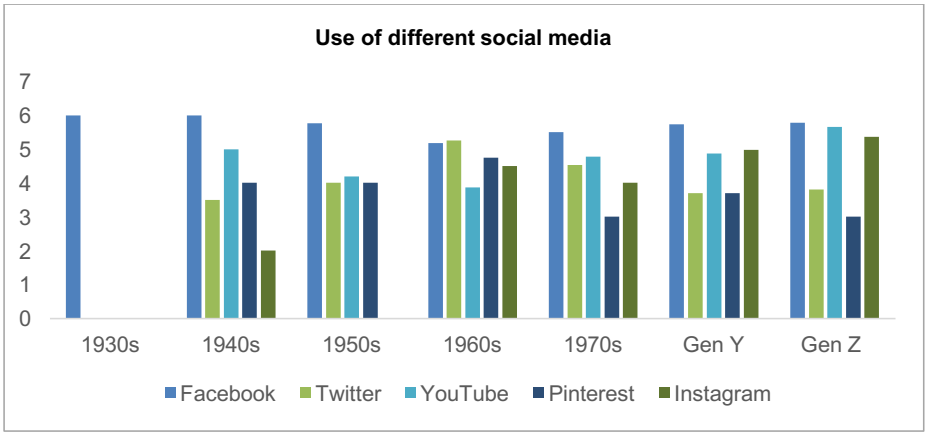

Figure 3 Frequency of use of different social media services by diverse generations

Figure 3 illustrates that Facebook is the one social media service used most frequently by all generations. Only users born in the 1960s apply Twitter slightly more frequently than Facebook. On average the representatives of the oldest generations use Facebook most frequently. One participant, born in the 1930s, reported using only Facebook (from all the inquired social media services) every day. Participants born in the 1940s also use Facebook most frequently, followed by YouTube, Pinterest and Twitter, whereas Instagram is visited rather seldom. Users from the 1950s visit Twitter, YouTube and Pinterest similarly often (around once a week), but not Instagram. The

participants born in the 1960s use Facebook and Twitter most frequently, followed by Pinterest (most frequently of all generations) and Instagram. From all the investigated generations, they reported using YouTube the least often. The users born in the 1970s reported using Pinterest least frequently, whereas they stated they used other services at least once a week. The digital natives (or Gen Y) visit Facebook, YouTube and Instagram most frequently, whereas Twitter and Pinterest are visited less often, rarer than once a week. Finally, the Gen Z participants used Facebook, YouTube and Instagram most frequently (Instagram most frequent from all the generations), whereas Twitter and Pinterest rather seldom.

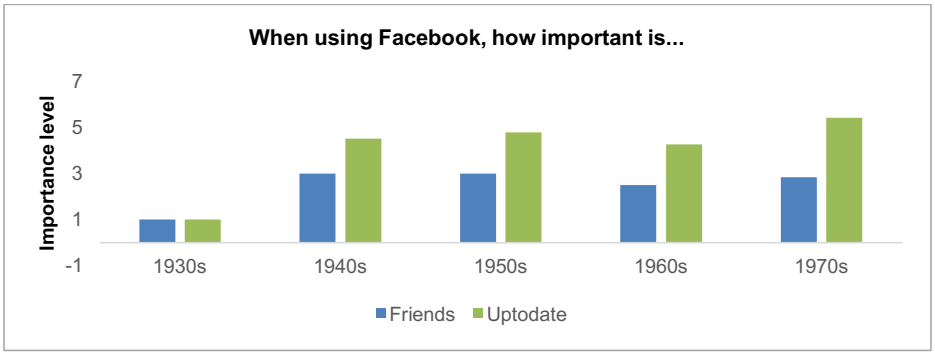

Figure 4 Important factors while applying Facebook

Since Facebook appears to be the most popular social media service (not only among the 'Silver Surfers'), let us take a closer look at factors significant for using the service. Figure 4 shows the importance of two factors while using Facebook—having many friends and being up to date—both factors which were indicated by participants in the oldest generations. Both factors are rather of moderate importance for most of the participants from other age ranges (3-4), whereas for representatives of the oldest generation, they are not important at all (1). Still, being up to date appears to be of higher significance than having a lot of Facebook-friends, especially for users born in the 1970s.

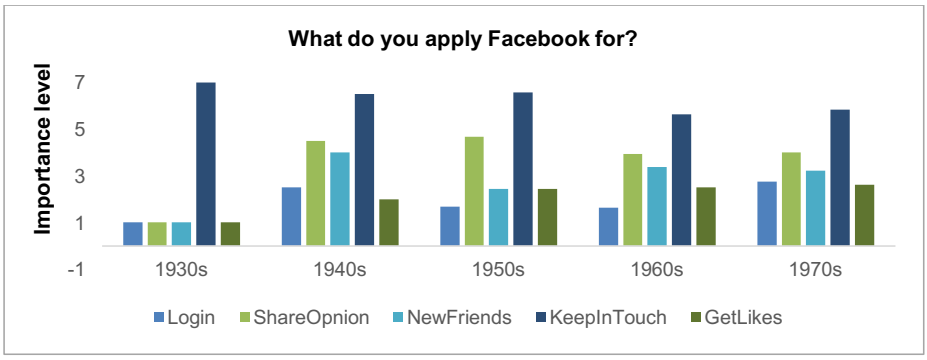

Figure 5 Motives to apply Facebook for the older generations

When asked for more concrete motivational reasons for using Facebook (figure 5), we recognize that "being in touch" with friends or family is the most important aspect (especially, for the 1930s user for whom this is the only reason to utilize this service). The second most important aspect appears to be the possibility to share one's own opinion with the community (especially for users born in the 1950s). There is rather neutral attitude evidenced towards "finding new friends" on Facebook, whereas getting a lot of likes or using the services just as a login tool, is not important (1-3) for all the 'Silver Surfers'.

Next, we turn to investigate the differences between 'Digital Immigrants', 'Digital Natives' and the youngest generation — 'Gen Z'. Figure 6 shows the probability of social media usage by these three generational cohorts. All groups are likely to use Facebook (especially the 'Digital Natives') and YouTube ('Digital Natives' and 'Digital Immigrants'). The most substantial differences can be seen for Twitter and Instagram. Twitter is more likely to be used by Digital Immigrants, followed by 'Digital Natives.' The distribution for Instagram is quite the opposite— 'Gen Z users' will probably use Instagram. The probability is much lower for Digital Natives and even scarcer for Digital Immigrants. Pinterest is not that popular among all three groups, but the usage probability is still the highest for 'Digital Natives' followed by 'Digital Immigrants', whereas for 'Gen Z users' reported usage is closer to zero.

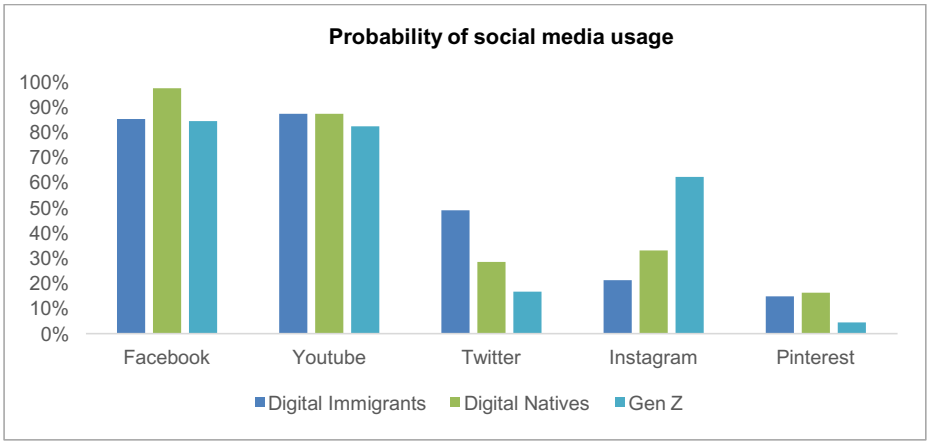

Figure 6 Probability of social media usage for Digital Immigrants, Digital Natives and Gen Z

Figure 7 compares the average usage frequencies for the five social media services and the three investigated generational groups.

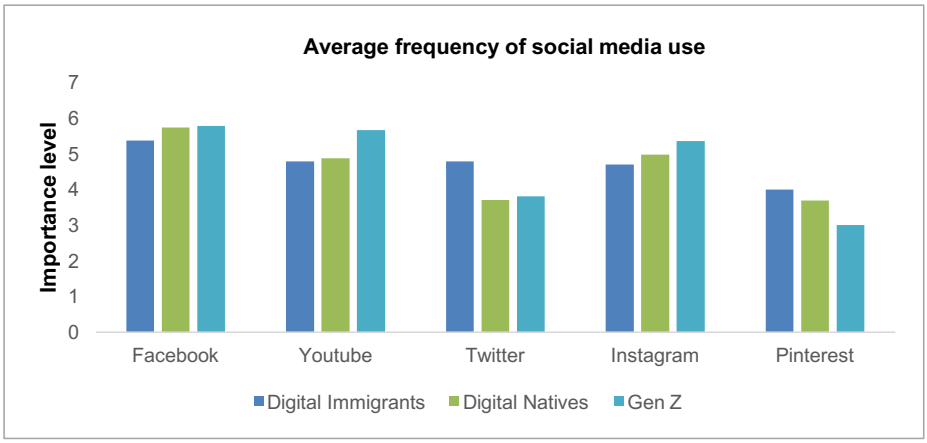

Figure 7 Average usage frequencies of social media services by Digital Immigrants, Digital Natives and Gen Z

Facebook is used most frequently by all three groups, whereas YouTube and Instagram are used most frequently by the youngest generation—Gen Z, followed by Digital Natives and Digital Immigrants (however, they still use the services on average few times a week). Digital Immigrants use Twitter most frequently (several times a week), when compared to Gen Z and Digital Natives (between once a month and once a week). Pinterest is, once adopted, used more frequently by the oldest generation. Indeed, digital Immigrants use it nearly once a week, whereas Digital Natives and Gen Z once a month.

Figures 8 to 11 depict the outcomes of t-tests conducted for usage frequencies and two motivational factors when using Facebook, Twitter, Instagram and YouTube. The values for each generation show the average difference from the pooled mean values for other generational groups.

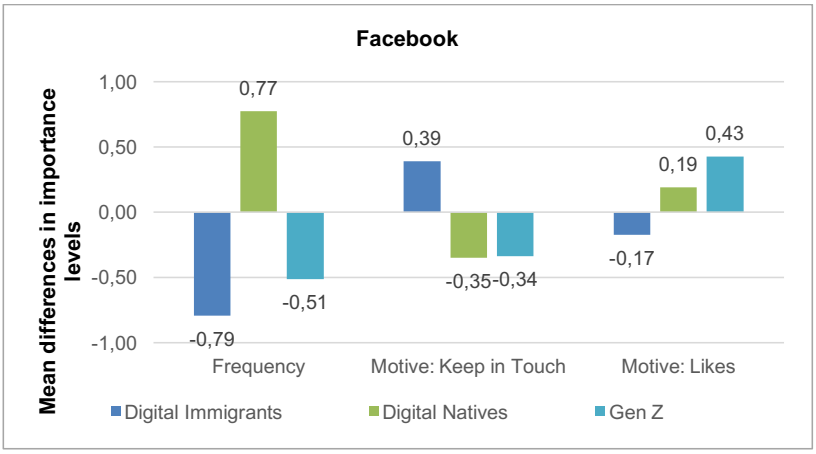

Figure 8 T-test outcomes for Facebook usage frequency and motivational factors of staying in touch with friends or family, and getting many likes

Regarding Facebook (figure 8), the biggest difference is given for the usage frequency. Compared to the average usage frequency, 'Digital Natives' are the ones using Facebook more frequently, whereas 'Digital Immigrants' followed by 'Gen Z' use it less frequently. There is also a clear divergence in the motivation. For Digital Immigrants, it is on average more important to keep in touch with friends and family, whereas getting likes is more important for Digital Natives and especially for Gen Z.

In Figure 9, the t-test outcomes for Twitter are indicated. We can see that this service is definitely more favoured by Digital Immigrants than Digital Natives and Gen Z. Digital Immigrants apply the services more frequently. For them, it is important to have many followers and to get a lot of likes and re-tweets. The younger generations seem to care on average much less about these aspects.

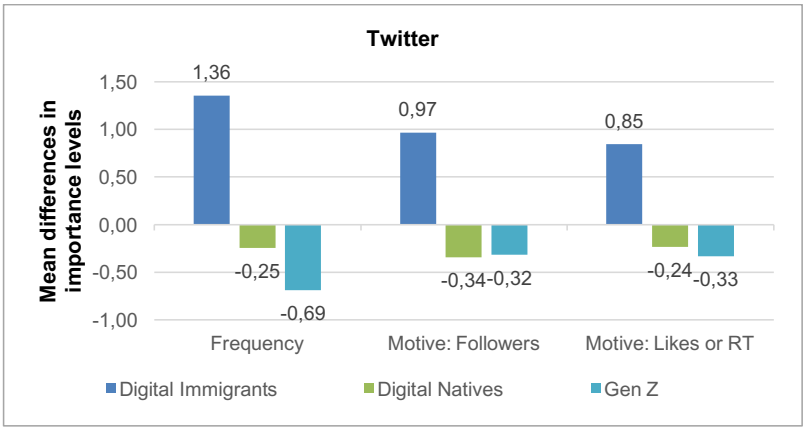

Figure 9 T-test outcomes for Twitter usage frequency and motivational factors of having many followers and getting many likes or retweets

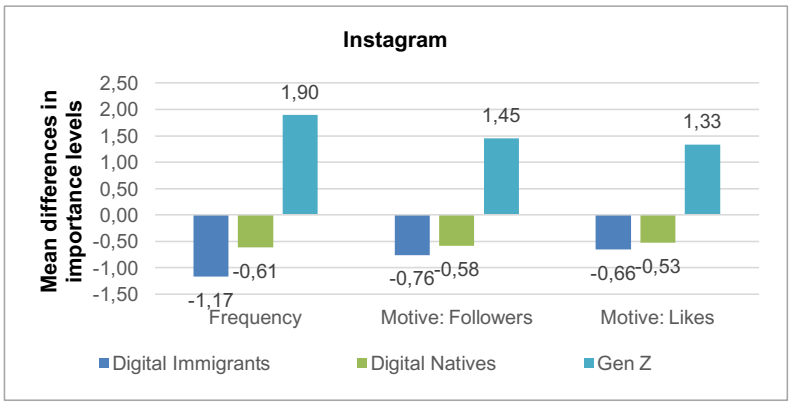

Figure 10 T-test outcomes for Instagram usage frequency and motivational factors of having many followers and getting many likes.

There is a similar tendency for Instagram (figure 10) and YouTube (figure 11), however, the current youngest generation (Gen Z) is the one standing out. The representatives of Gen Z use the service far more frequently than the other two. For them, a high number of followers, as well as getting likes, are more important aspects than they are for Digital Immigrants and Digital Natives. From both older generations, 'Digital Immigrants' are the ones using the service even less frequently than the 'Natives'. They also care less about the attention and rewards in form of followers and likes.

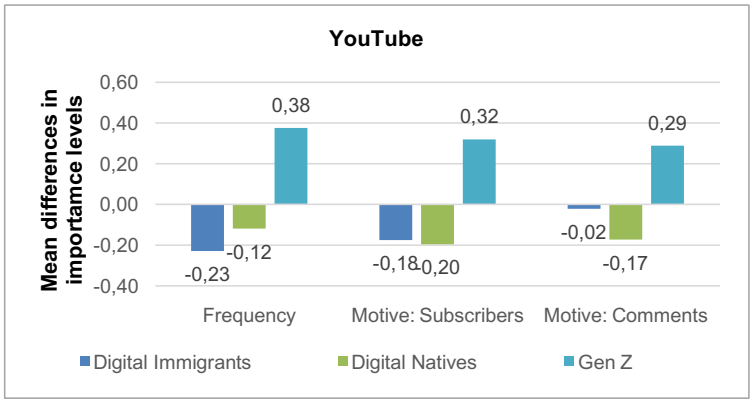

Figure 11 T-test outcomes for YouTube usage frequency and motivational factors of having many subscribers and getting a lot of up votes or comments

Similar results are found for the service YouTube (figure 11). However, here the mean differences are not as profound as for Instagram. On average, users from the Gen Z use YouTube slightly more frequently. Furthermore, they care slightly more about subscribers and getting comments and up votes. Digital Natives are the ones caring least for comments, up votes and subscribers. Then again, Digital Immigrants are the ones using the service less frequently than the remaining average.

There are also gender-dependent intra-generational differences in social media usage. Figure 12 shows the probability of social media use for five services and the three generational groups divided by gender. When analysing the probability of social media usage within the Digital Immigrants, we can see that the male users are more likely to use YouTube than Facebook, whereas female participants reported a preference for Facebook and YouTube. Still, both user groups are likely to use Twitter and less likely to visit Instagram or Pinterest. When analysing the Digital Natives, male and female users are very likely to use Facebook, followed by YouTube. Both groups are far less likely to use Twitter compared to the older generation. Also, female users would choose Instagram over Twitter. For both groups, the least likely service to engage with is Pinterest (however, female users are still more likely than male to use it). Finally, the gender-dependent inter-generational differences are also reported for Gen Z. In this study, the male users prefer YouTube to Facebook. These are the two services they are most likely to use. Far behind, but still quite likely to be used, is Instagram. For Twitter and Pinter-

est the probability is closer to zero. The female users choose Facebook over YouTube and they are also very likely to apply Instagram. Similar to the male users from this generation, they are much less likely to use Twitter and Pinterest.

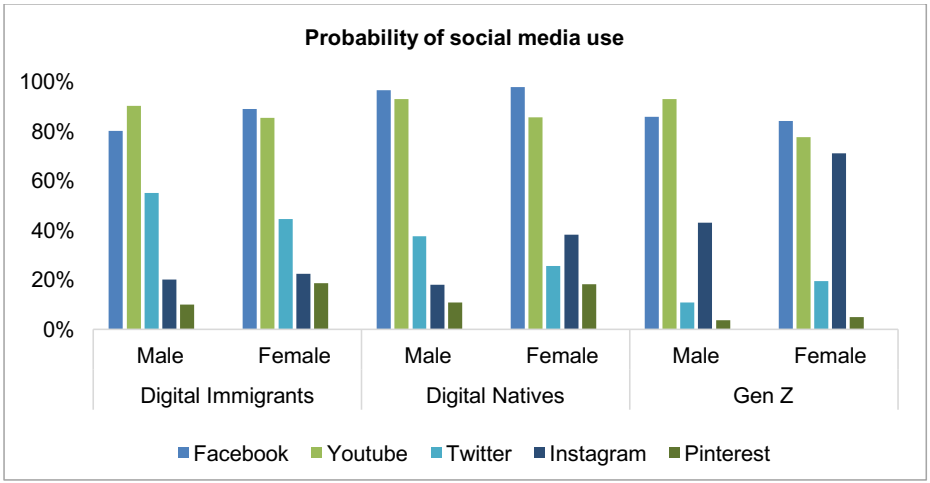

Figure 12 Probability of social media use and gender-dependent differences between Digital Immigrants, Digital Natives and Gen Z

Figure 13 shows the average frequency of social media use of the five services for the investigated three generations divided by gender. For the Digital Immigrants, male and female users use Facebook almost every day.

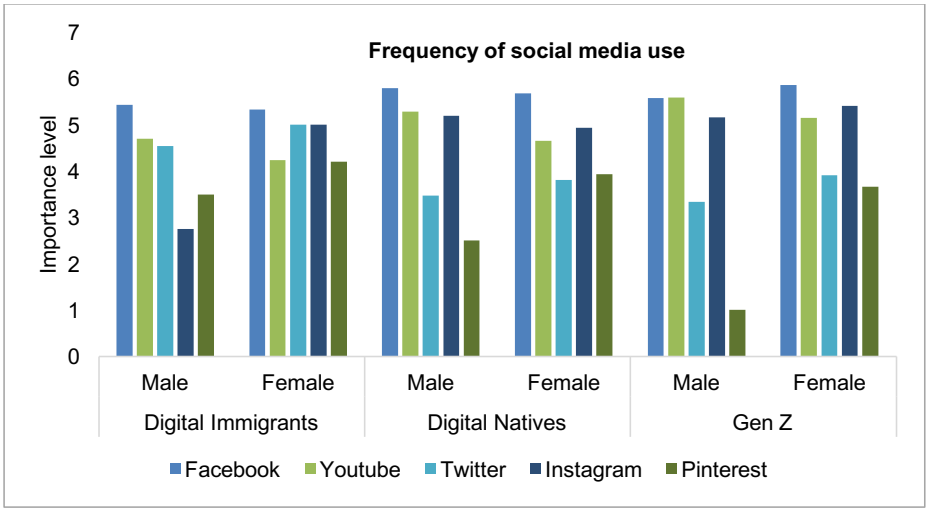

Figure 13 Frequency of social media use and gender-dependent differences between Digital Immigrants, Digital Natives and Gen Z.

Female users also use Twitter and Instagram very often, whereas YouTube and Pinterest are reportedly visited around once a week. Male users use YouTube and Twitter quite often (once to several times a week). However, they use Pinterest only around once a month and Instagram even less often. The male Digital Natives use Facebook, YouTube and Instagram several times a week or even every day, whereas Twitter and Pinterest were visited far less often. Female Digital Natives use Facebook on average every day, Instagram and YouTube several times a week, whereas Twitter and Pinterest were reportedly visited approximately once a week.

Finally, the male representatives of Gen Z apply Facebook and YouTube equally frequently—several times a week to every day, and Instagram only several times a week. They use Twitter less frequently—less than once a week, and Pinterest even more seldomly than every month. The female users from Gen Z use Facebook and Instagram most frequently (between several times a week and every day), followed by YouTube (several times a week). They use Twitter and Pinterest more frequently than male users—between once a week and once a month. In general, female users seem to apply all services more frequently than the male ones. Hence, once a female user (from whichever generation) decides to use a social media service, she uses it quite regularly. Male users, on the other hand, use some services very seldomly, instead of completely opting out.

Discussion

In many developed countries, the digital divide based on technological accessibility has been already bridged. For a long time, age was assumed to be one of the issues restraining some portions of the population from using the Web. With time, older people started regularly using Web and its applications—not only the basics like emails or search engines, but also the Web 2.0 applications like social media services. The Web 2.0 is not anymore solely young people's domain. One important question that arises is 'how do the Silver Surfers and so-called Digital Immigrants apply social media?.' In order to determine the probability and frequency of social media usage by older generations, an online survey was conducted. The outcomes show inter-generational differences in social media use—the probability of social media usage, its frequency as well as some motivational factors regarding which services were being used. Furthermore, gender-dependent intra-generational differences were detected.

The results showed that there are indeed inter- and intra-generational differences. While the older generation, for example, Digital Immigrants, prefer services like Facebook for keeping in touch with friends and family, they also engaged with Twitter and reportedly enjoy getting many followers. Digital Natives prefer Facebook and YouTube, and reported to enjoy the likes they get on Facebook. The youngest generation, Gen Z, prefers YouTube and Instagram. The users from Gen Z, as indicated by our study, do not use Twitter often; they also use Facebook less often than the other older generations. Finally, there are intra-generational differences between male and female users. Female users

are most likely to visit Facebook, followed by YouTube (in turn, male users from the oldest and youngest generation prefer YouTube over Facebook). Furthermore, female users from all generations are much more likely than the male users to apply Instagram. Finally, female users seem to use all services more frequently than the male participants. Hence, once a female user decides to use a social media service, she tends to use it quite regularly. Male users, on the other hand, use some services very seldomly instead of opting-out.

In conclusion, Silver Surfers and Digital Immigrants apply some of the popular social media, especially Facebook, Twitter and YouTube. While Facebook and YouTube are popular among all investigated generations, the most interesting inter-generational divergence is given for Twitter and Instagram. The micro-blogging platform Twitter is mostly applied by older users and gets less and less popular with the younger generations. Instagram, on the other hand, is least applied by the oldest generations and gets more and more favoured with the younger ones. Twitter is a text-based platform often applied for news dissemination (Hornik, Satchi, Cesareo & Pastore 2015; Kwak, Lee, Park & Moon 2010), which is why it might be preferred by older age-groups to image-based platforms like Instagram, often associated with narcissism and self-promotion (Moon, Lee, Lee, Choi & Sung 2016). "An Instagram picture may be worth more than a thousand twitter words" (Pittman & Reich 2016, 155), however, this thought applies only to the young adults and not the Silver Surfers or Digital Immigrants. The most striking gender-dependent difference in social media usage is the preference of the picture-sharing networks Instagram and Pinterest by females of all generations as well as more frequent usage of the platforms they once adapted. It appears that men are fonder of the text-based networks.

The main limitation of the study is its rather superficial, exploratory character. More in-depth questions and possibly a number of quantitative interviews could lead to more complex motivational reasoning for adapting a social media platform or not. A bigger sample of Silver Surfers, especially born between 1930s and 1950s would lead to a more founded conclusion. Finally, since this is a cross-country study, the incorporation of country-specific social media platforms (e.g., vk for Russia, nk for Poland), could result in a bigger sample.

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The Elderly's Media Appropriation as Variable for Target Groups

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ABSTRACT

Media and media appropriation can be the basis for diversity and also for commonalities, describing target groups more exactly than the chronological age approach does. This paper demonstrates why it is necessary to expand the view of target groups beyond mere classification in the category of age, especially when the focus is placed on the elderly. It establishes that there are other possibilities than age to find also appropriate classification categories for the elderly by means of media appropriation combined with Bourdieu's forms of capital. This paper suggests that, regardless of whether media use, education or media literacy, if the media research is intended to reach fruitful ends, its instruments need to be developed with media specifically in mind. In this case, they need to be subject-orientated in relation to the media appropriation of the elderly.

KEYWORDS

media appropriation, target groups, the elderly, capitals, diversity, media education

Introduction

Naming 'the elderly' implies referring to a diverse target group. Target groups are common within the educational research and analysis as well as in the practical experience, because it is fruitful to establish differences and similarities between group members regarding the aims of the project. Even so, target groups in media educational research are mainly derived from the age of the group members. For example, the concept of media competence[1] is commonly geared towards such target groups as children, youth, adults or the elderly. This arrangement might make sense in the case of babies or children due to their similar physical and mental development within similar life-courses. In contrast to childhood and adolescence, the life of adults and the elderly is more distinguished by increasing variable life situations and circumstances with advancing age (Schenk 2011). This diversity is based on several aspects such as personal options, talents and interests as well as political liberalism with rising individualisation and a high standard of living, which generate many and variable opportunities for acting (Baltes und Nesselroade 1979; Jäckel 2010). In terms of media and their development

[1] The choice of the term 'media competence' over the concept of 'media literacy' is intended, because of the different point of view and scientific genesis of both terms. While media literacy is used in Anglo-American debate (Livingstone 2004), and follows a pragmatic standing, 'media competence' will be used as an equivalent for the German term 'Medienkompetenz' with its theoretical background and idealistic participatory meaning (Ganguin et al. in print).

during the last decade, these vast developments have broadened various possibilities, similarities in experience and differences. The article presents a possibility how acting with media – described with the concept of media appropriation – can be used to linked to the independence of aged people.

Chronological Age as a Confuted Influence

The group of elderly people is mostly defined through chronological age, although this definition includes a group of highly diverse people (Haubold 2015). For the elderly, the new media currently present with the changes of digitalisation are clearly essential (Jörissen and Marotzki 2009, 7; Aufenanger 2008, 88), and important considerations when examining media appropriation, but so too are the past influencing variables (medial and non-medial) (Baltes and Schaie 1973). Equally, one past influence that must be considered for research into media appropriation is the subjects' primary socialisation, which has no less important influence with increasing age (Hartung 2007, 67-79). Because of this fact, the frequently used categorisation 'age' – within the meaning of 'date of birth' – in research into media education could be a good choice describing elderly's similarities, because the same birth years could 'produce' similarly socialised people. Referred to Bernice L. Neugarten, this category is named *historical-time* (1979, 364). The historical-time is comprehensible because structural life contexts and long-term situations – such as political and economic systems – are often constant and lead to equal fields of acting. In the case of media, those historical-time-managed influences are not consistently determined by certain years. For example, the difference of media appropriation by today's elderly, who were socialised during the same years within a divided Germany after the Second World War, is significant. This is the case, for example, due to their general socialisation through the different political systems (German Democratic Republic GDR, Federal Republic of Germany FRG) and on the other hand through differences in media content, implementation (colour TV or VCR) and related media-repertoire (Schorb 1995, 95).

In addition to historical-time, Bernice L. Neugarten defines *life-time* and *social-time*[2], which leads to fewer differences between the elderlies past media appropriation (1979, 364). With such generation- or life-time groups (Mannheim 1970; Zinnecker 2003; Böhnisch 2012), a greater similarity is to be expected because the contexts in which media appropriation is embedded, show more similarities and this is due to equal content-similarities. In the case of media as mediator, media appropriation could be very similar. Despite, there is still the problem that the historical-time category creates: those who are/were not involved in the mainstream (e.g. generation of '68), cannot be described collectively (Zinnecker 2003, 47). Furthermore, technical differences – when media is the object of appropriation – still are not explained sufficiently. In the current discussion there is a frequently-used category dealing with connecting *life-time* with the

[2] Social-time means the time that structures the course of the life of a person, such as, for instance, childhood or puberty (Becker 2008, 206) while life-time determines in which social-time a person experiences a historical-time period (Neugarten 1979, 365).

technical aspects of media. It is described as dividing individuals into 'digital natives' and 'digital immigrants' (Prensky 2001). As a media-based category, it is a nice attempt at finding similarities such as technical familiarity. The problem with this categorisation is that this concept cumulates in a group that is very different in its preconditions of appropriation (Kübler 2012a, 2012b) because other aspects (especially content-aspects) are disregarded. Eventually, the concept is still reduced to fixed years; neither life-time nor historical-time nor other contexts are variables considered in this approach. Therefore, it is more one of the many approaches that defame the elderly rather than being a useful instrument for research. Moreover, it should be the aim of research to abolish discrimination; as Frank Schirrmacher puts it, 'We need to declare war on the defamation of age.'[3] (2004, 33).

It is necessary to find an additional approach, which solves the problem of age-discrimination and vast diversity among the elderly. For example, there are concepts such as life-long-learning and active-agers, which implicitly positive discriminate elderly people by age or normative downgrades such as the term 'digital immigrants'. Both can lead to real psychological and motivational problems in aging (Schneider-Flume 2008, 43). On the other hand, there are approaches, which try to abolish discrimination. One attempt is describing age no longer as a deficit (Engel 2013; Gehrke 2004; Kubicek and Welling 2000) e.g. as a claim to participation (Hartung 2009; Künemund 2001; Patzwaldt und Staudinger 2012; Stadelhofer und Marquard 2012). Another step, could be, to describe scientific phenomena no longer on the basis of age. For example, several subject-centred approaches focus on different non-media-categories such as biological, physical or mental changes (Simon et al. 1999, 29), life-time situations of flux such as the exit from working life, the death of a spouse, contracting disease(s) (Doh 2011; Jahoda et al. 1980; Kruse 2011; Schenk 2011; Kruse 2002) or on biographical differences, interests and routines (Hartung 2009). Other rare approaches focus on media-orientated similarities or differences such as media equipment and prior knowledge (Böhnisch 2012; Kübler 2012b; Pietraß und Grengs 2012), which could occur at any stage of the life course. Accordingly, media appropriation could be added to the media-orientated non-age-descriptions of the elderly.

From Media Appropriation to Contexts

Media appropriation is a suitable concept to describe similarities and differences between groups of people – in a mediatised world (Krotz, 2008, 23; Jenkins 2008), where acting can always be acting with and through media – because it describes acting and interaction within its contexts. Appropriation is the process by which an individual develops a learned skill/ability thus appropriating it to its *own* skill/ability (Leontjev 1973, 240). The individual is able to apply and improve, change or develop this 'new, own' skill/ability (Leontjev 1973, 240; Hurrelmann 1995, 158; Geulen 2005, 313). If as-

[3] Own translation of: '[Wir müssen] der Diffamierung des Alters den Krieg erklären.'.

sumed that the subject is acting freely and with self-determination, it cannot be seen as profitable to deal with the term of media 'use'. Rather, it makes sense to deal with the concept of 'appropriation.' Therefore, media is, on the one hand, the object of appropriation, because media are human-made and their content also construct society (Geulen 2005, 216). Due to this, Alexej N. Leontjev characterises appropriation as the 'most important ontogenetic evolutionary principle' (1973, 235) because it reproduces history and defines a human being – and thus an individuals' – skills, abilities and attitudes. At the same time, to use these abilities, a mediator is necessary (Leontjev 1973, 236). For this, media also can, on the other hand, be the mediator (Leontjev, 1973, 236) of the content which is/has been appropriated.

Within the scope of media education in Germany, Bernd Schorb and Helga Theunert (2000) define the term of media appropriation with a view on media as mediator. They divide the process into four steps through which the individual passes. In the beginning, the subject *perceives* the medium as object of appropriation itself or as medium in and of itself. In the second step, the individual *understands* with the help of past appropriation and within her/his contexts and already available skills and abilities. Nearly simultaneously – described in a third step – the content is evaluated with personal categories. For the last – fourth step – the understood content will be *applied* and *processed*, which means that the individual transfers the new skills and abilities and integrates them into her/his thinking and actions (Schorb 2009, 183). In Bernd Schorb's (2009) definition, it is necessary to practically use media, thereby the newly appropriated skills and abilities can be applied physically as well as mentally. Furthermore, Schorb mentions that the contexts, especially everyday life, are important for media appropriation (2009, 183). This might sound banal but it is not less important to describe and research an individual solely in her/his own contexts.

This leads to the conclusion that media appropriation is embedded in the singular context and personal life-world (referring to Edmund Husserl's concept (Zelić 2008) of the individual and the single appropriation situation (Leontjev 1973, 246; Hurrelmann 1995, 162; Schorb 2009)). The *personal life-world* is the 'constituted real environment of experiences and possibilities for action. It is the lifeworld, in which education and socialisation take place and for this encompasses and determines every human communication'[4] (Baacke 2007, 52). This suggests that, appropriation forms society and is also embedded in society. Every appropriation depends on the society, situation and the object, which defines the possibilities for action; age-independently. Thus, if media are viewed as mediator, similarities in interaction with them and in appropriation of the content are also similarities in media appropriation. For this, media appropriation could be added to other categories – such as age – as variable for target groups. It can be a connecting element between target group members.

[4] Own translation of: Die persönliche Lebenswelt ist die ‚konstituierte reale Umwelt von Erfahrungen und Handlungsmöglichkeiten. Sie ist der Lebensraum, in dem sich Erziehung und Sozialisation abspielen und der damit alle Kommunikationen eines Menschen bestimmt und umfaßt'.

Describing Diverse and Similar Contexts with Bourdieu's Capitals

An individual has not only their own repertoire of skills and abilities, but with this their own singular preconditions for media appropriation (Geulen 2005, 215). Furthermore, an individual is part of their society and has, with they place in this society, individual possibilities for action. To describe methodically this possibilities of action, this section offers the combination of two theories about people's contexts: Klaus Hurrelmann states that action – and thus also interacting with media – is embedded in the subject's 'inner' and 'outer reality' (1995, 162). To fill this concept a point of view for a new approach here could be Pierre Bourdieu's capitals (1983, 190). In his system-critical description, Bourdieu categorises *fields of action*, which describe the possibilities of action an individual has. Even if his theory had other intentions, the concept was and is useful for social science research (Schulze 1997, 20) because it concentrates and covers a broad range of human action and interaction. Thus, the approach can be adopted beneficially to media appropriation.

On the assumption that the subject has an inner and an outer reality, which are mutually influenced (Hurrelmann 1995), it is necessary to apply Bourdieu's categories to both of them. In combination with Pierre Bourdieu's capitals (1983, 190), describing *inner reality* is connected with inherited capital, social and cultural as well as economic. An aspect which is not described with these categories – but important in the debate about media appropriation of individuals – is how to describe the fields of action, which are *immanent parts* of the individual, for example those, that are needed during the subject *perceives* media as content or mediator. Therefore, a new form of capital is added to the concept: the inherited '*physical and mental capital*' (including genetic characteristics), which is derived from Klaus Hurrelmann's model of innate subject immanent influencing variables (1995, 276) and can be supplemented by Bourdieu's concept of habitus, which both subsume societal and personal attitudes and values (1999, 104).

For media appropriation, the *selection* process is fundamental because every action has an aim. Aims are dependent on the situation and individual interests (Lauber and Krapp 2013, 97), which e.g. furthermore depend on attitudes, values, motivations, needs, heuristics, moods, emotions or previous knowledge (Früh 1991; Gigerenzer and Gaissmaier 2011; Goldstein and Gigerenzer 1996; Katz et al. 1973; Mahrt 2014; Matthes 2014; Katz et al. 1973; Schenk 2007). These subject immanent influencing physical and mental capitals are decisive because media appropriation is started by the individual and is bound by the individual's skills and abilities (Geulen 2005, 215). For *perception* and *processing* during media appropriation, skills such as hearing or seeing are needed to listen or watch. For processing, mental capital such as cognitive skills and abilities are important. Concerning the elderly, a noteworthy cognitive change is the decrease in long-term and short-term memory (Matthes 2014, 18), as well as sensory-motor influencing variables. *Inherited cultural capital*, which is subject immanent, could include (especially through the process of primary socialisation) language level, societal or familial values, emotions, assessment systems or communication practices (Renckstorf

1977; Hurrelmann 1995, 158). Also strongly connected with primary socialisation, is the *inherited social capital*. The social network in which an individual is born (e.g. in the form of family, or superordinate citizenship, religious and society affiliation as well as the tightness of the relationship and the number of interaction partners), forms the basis for further social relationships and also is more resilient than others (Bourdieu 1983, 190). Interaction, and in particular, interaction with media when media are objects or mediators of communication, is defined by the possibilities the social capital offers. *Inherited economic capital* includes not just available money but also any object that is 'convertible' directly into money (Bourdieu 1983, 185), which refers for example to media equipment. These are the fields of inner reality in which the individual has her/his action-possibilities.

The *outer reality* can also be composed of these forms of capital. Media as objects can be seen as *cultural capital*, or rather as *objectified cultural capital* (Bourdieu 1983, 189). Media-repertoire describes the media appropriation aspect of both *objectified cultural capital* and *economic capital*, when media are used as objects, with their (arising) costs, value or availability (e.g. when they cannot be purchased because they are too expensive; when they cannot receive channels or the internet because of a missing network). Moreover, *institutionalised cultural capital* describes the knowledge possibilities an individual has because of her/his formal and non-formal education (ibid.), which could include media-literacy, technical knowledge, usability, and thus nevertheless content-related knowledge.

Regarding the appropriation of new media, non-formal processes should predominate in quantity whereas formal education should be of a higher grade of quality. Bourdieu (1983, 190) also divides the field of *social capital* into two areas: institutionalised (e.g. through marriage, or party affiliation) and non-institutionalised social capital (e.g. neighbours, friends or peers). For media appropriation this is not just crucial because of the possibility or necessity to communicate through and with mediator media, but also for media as objects, when the capital of the relational partners can be used and therewith the economic and cultural capital of the individual can be grown exponentially (e.g. the media-repertoire or literacy). This context of the relational partners is often overlooked in media research, although it could be a significant influencing variable, especially with regards to the media appropriation habits of the elderly.

In order to analyse the media appropriation of an individual, the focus needs to be expanded to encompass the framework conditions, in which subject and media are embedded (Geulen 2005, 215). Behind every culture there is a balance of power, which has the power of definition (Berger und Luckmann 2004; Marchart 2011), which structures the society and with this the individual's life-world and possibilities of action. These contexts are crucial, on the one hand, for the individual's culture with its structures and laws, and, on the other hand, for the cultural *praxis* of the appropriated media. This is particularly true when media are used to legitimate (economic or political) power (Hepp 2010, 78). Those definitions influence the fields of action through laws, values, and

structures (Hepp 2010, 74). A deep interpretation in the manner of cultural studies should not be a part of the presented concept but ideas from this field can be used as a fertile impulse when regarding an individual's contexts. In an enlightened manner, the media education researchers (e.g. Baacke et al. 1990; Schorb 1995; Hüther und Podehl 2010) attach importance to this in their research and try to establish media competence as a critical ability to identify and investigate such imbalances of power. Bernd Schorb states how decisive structures of power and cultural capital are (1995, 186). An individual can only act independently and maturely if it is able to see through the structures of power and comprehend its role within them. Additionally, the subject's action depends on her/his everyday life. Media appropriation is a part of everyday life. Therefore every named possible influence is embedded in it and a comprehensive view needs to both focus on it (Paus-Hasebrink 2013, 36) as well as on non-everyday-life incidents such as life caesuras.

Nearly all of these possible influences are age-independent. But goals and possibilities act in accordance with the abilities and previous experience of the media appropriation of each subject, since they accumulate with growing age and the corresponding diversity rises. It could be postulated that the more each individual is like another person, the more the media appropriation of these people matches, irrespective of age.

Age as a Less Determining Context

Regarding all these contexts, it is clear that, whilst age is one factor, it is not *the only* factor that influences media appropriation. The following will show how past analyses can be reinterpreted by applying the conceived capital-based concept.

One common definition of the elderly within the field of educational research is *people who have retired from active working life*. Nowadays the field of pensioners is characterised by broad diversity. If the exceptions of early retirement are not taken into account, then in Germany retirees can be between 63 and 112 years old[5]. Even if chronological age were an influencing factor, an age category spanning nearly 50 years cannot describe a highly differentiated group, as it treats all within the group as a homogenous mass of 'old people'. Unfortunately, however, important surveys often treat the individuals in this category as one group (e.g. ARD/ZDF-Onlinestudie 60+ (Frees and Koch 2015)). Some researchers, however, do acknowledge this difference and divide old age pensioners into age categories, for instance, young-elderly (60–65) and old-elderly (80 or 85+) people (DZA 2016) or younger-elderly (55/60–75), middle-elderly (75–80/85+), elderly (75–90) and very elderly (90+); sometimes the group of 100+ appears in the descriptions (Menning and Hoffmann 2009).

The free ranging scale of the age categories clarify how arbitrary they are, especially regarding other age ranges (such as early childhood, childhood or adolescence) because

[5] In Germany, the eldest current retiree was born on 28.01.1904 (dpa 25.05.15 10:42).

the age groups for the elderly do not orientate themselves on five-year periods. One reason for this is that these categories orientate themselves towards the development or circumstances, which are defined through the course of working-life with preschool, school, secondary school forming the basis for the divisions. People in retirement, however, no longer participate in this meaningful structure. Therefore, it only makes sense to focus on the caesura retirement – age-independently. In the case of media appropriation, this caesura could be interesting because the various capitals change with it: from one day to the next, economic, social and cultural capital as well as everyday life can rapidly change. Less income, for example, can influence media repertoire (economic capital), a removal from working life can imply losing regular contact with co-workers (social capital) and their capital (cultural capital). Whereby more leisure time gained through retirement can lead to longer or more intensive media appropriation with a wider media repertoire. It seems, therefore, that age or caesura can be replaced because the changing capitals are more significant, which explains the '*why*' of media appropriation and does not just describe *what* is changing.

How strong these changes are derived probably more from capitals than from age or the life-caesura retirement. It is not necessary to know why an element of social capital such as co-workers ceases (because of retirement, age or because of a conflict), rather it is important to know that this change is happening and what it means for media appropriation.

Gender as Less Determining Context

An also age-independent aspect, which is often and arbitrarily set as a variable influence, is gender. Another interpretation, with the introduced concept, would regard gender not merely dichotomised into two or three categories (e.g. male, female, transgender). Instead it could be considered as inherited physical and mental, and cultural capital. Like other values, gender is cultural and socially negotiated (Wegener 2008, 44; Kogan 1979, 252). The possibilities are as variable as society and culture define their expectations (Hurrelmann 1995, 257). Therefore, it could be useful, to see and interpret gender as potentials of action which are possible for the individuals in the moment in which they act; and in special cases, in which they act with media. Therefore, not just age, also gender (as example for other socio-demographics) needs to be reinterpreted concerning media appropriation.

Some research findings connect age with gender, although the capitals behind both of them are equal and also discussable. For example, Michael Doh points out, that equalities between the media repertoire and gender increase with increasing age (2011, 237). This should show the strong connection to societal values because some kinds of media were more, some less, received by either men or women. Doh interprets newspapers as a typically elderly's male medium (2011, 237), without thinking about further contexts, which could be also relevant: newspaper-reception, as a male dominated activity, could

simply be due to the fact that elderly women – e.g. because of their role as housewives and mothers – have less time or (regarding the content) less interest because of their job or social network in traditional newspaper categories (such as economy, sport or politics). For working women, this difference between men and women is unexpected. It is more a difference between people with interests in newspaper's content or practiced profession. On the one hand, gender is not *the* influencing variable, but rather the possibility of and interest for media appropriation. On the other hand, such interest reasons change as well as gender roles change. For the elderly, these times could also change. Maybe they have grown up in a world dominated by men but now they are emancipated – or not – similar to the way younger people are – or not – emancipated. For this reason, age for itself is less relevant than socio-cultural and political contexts and ideologies or personal circumstances. Gender is also less relevant as well it is therefore a problematic category. The contexts of inherited cultural capital and specifics in society's fields of action can say more about similarity in media appropriation than those aspects do.

Physical and Mental Capital as Considerable Determining Contexts

When applying the capital concept introduced above to the problem of target groups, it becomes clear that the elderly's media appropriation can be very diverse (Haubold 2015) likewise, the capitals could originate similarities. With increasing age, physical capital tends to decrease (Horn 1979; Weise 2007; Ziegler 2008). This is crucial for media appropriation in the state of *perceiving*; for example, when pressing buttons, tunes and auditory signals are recommended beyond visual information as declines in visual, auditory and haptic sensations tend to occur (Menning and Hoffmann 2009; Horn 1979) and influence media appropriation. Auditory deficits mostly can be compensated with volume control, whereas haptic or visual abilities influence the appropriation of media in regards to content as well as media as mediator. For visual content such as print-products, TV or tablets and smartphones, it means that there can be differences in understanding on the one hand. On the other hand, auditory media (which do not need visual abilities) also require other sensory skills to be initiated, for example through haptic or visual processes (e.g. by pushing the right buttons at the right moment). This combination of processes is widely diverse in computer game appropriation for example. These changes are often misunderstood as lacking motor skills, which deteriorate not only with *greatly* increasing age (Horn 1979, 306; Doh 2011, 74), but rather depend more on repetitive use (Saß et al. 2009, 31).

For example, while playing a game, it could be possible that a younger subject has – with regard to their visual abilities – an advantage, but this person's motor skills are not different to those of the older subject. As a logical consequence of the theoretical data it could be stated, that the elderly person is the better video gamer because their skills have been honed through regular practice. Regular practice has enabled the elderly person to develop the best skills for video games. This demonstrates yet again that many influencing variables are not age-dependent because two people of the same age could

have the same skill discrepancies as well. To put it differently, for example, if one person is near-sighted and has forgot their glasses, but is more familiar with the game, the appropriation would be similar because it is less connected with age than it is connected with the subjects' varying capitals – and in this case connected with media repertoire and visual abilities.

The target group of the elderly also is not different from other groups in its media appropriation when regarding mental capital. If physical capital would adhere to the concept of age, two groups of people would exist: Cognitive abilities begin to decrease starting at the age of thirty (Becker 2008, 207), which means (following the same arbitrary line of logic) that if groups were created based on age, then one of these groups should contain people up to thirty while the other contains people over thirty years of age. This is no fruitful step. For this, it could be a good addition to regard physical capital age-independently. There is less age-dependent loss in long- and short-term memory (Horn 1979, 298), both of which are crucial for *processing* during media appropriation. They depend on individual selection (such as interests or object stimuli) and repetition (Matthes 2014, 16), which means they are age-independent and similarities can be seen in the subjects' capitals. If an elderly person does appropriate a medium (no matter if for the content or as a mediator), the appropriated medium can remain in the person's memory much as it does in the memory of a younger person (Horn 1979, 298). At the same time, it is possible that, when appropriating new media, the elderly can compensate for deficits through their life experiences. Visual abilities, for instance, can be reconstructed with the help of such associational skills.

Practical Example 'Medienclub Leipziger Löwen'[6]

In summary, the more people are like each other, the more their media appropriation matches; and this occurs age-independently. The cross-generational media project 'Medienclub Leipziger Löwen', demonstrates this aspect. The group members presently are in the process of creating an app together. Some of the participants are not even users of a smartphone or tablet. It is important to note that (in opposition to the statistics (Frees et al. 2015)), it is not just the older people involved in the media project who lack any kind of tablet or smartphone. In addition, some of the younger members are still without these media devices. The motivation of our old and young members alike for not using smartphones sounds straightforward: they do not need them because their friends and family can contact them by (standard mobile) phone and they are satisfied with this means of communication.

[6] The 'Medienclub Leipziger Löwen' (Media-Club Leipzig's Lions) is an intergenerational volunteering group of the GAM e.V. (Gesellschaft Alter(n) Medien e.V.), which realises in peer-learing-processes and on the basis of learning-by-doing several media projects according to the topic age since 2010. The youngest member is 25, the eldest 86 years old. (Further information about the group and projects at: www.leipziger-loewen.org).

Furthermore, they know about the advantage of the mobile internet, but for both groups it is sufficient to surf the internet and answer emails on their PC at home or work (Haubold 2016). For them, it does not matter how old they are, or which gender they have. Their social capital as well as their media repertoires connect them in their media appropriation. As an illustration, based on their media-literacy regarding smartphones, it is possible to conclude what is relevant for the practical work and where the methods and visualisations need to be adapted. For example, the participants do not work with their own media devices, but rather in groups with others or with paper and pencil. Explanations need to be more detailed in general, but they can build on what is similar to internet use on a PC, a field with which they are familiar. In fact, the only two members of our club who have their own tablets are over fifty years of age (Haubold 2016). Both of them have social-capital and media-repertoire reasons for owning a tablet: they want to Skype with their families and do not want to use a PC for this purpose.

This practical example is, obviously, only a first sampling. More similarities linking various groups still need to be discovered. It does, however, represent a small-scale study example for practical experience according to the theoretical considerations about the forms of capital as categories as explored above.

Conclusion: The Elderly's Media Appropriation

After thorough exploration of the examples above, it becomes clear that the current target groups model cannot be unproblematically mapped onto the elderly due to their diversity. The elderly's actions with media is varied, and not just because of their age. The 'age' of a person as a definition for target groups must be strongly criticised and reflected upon. A more informative approach could be accomplished by using Pierre Bourdieu's forms of capital – supplemented by physical and mental capital – which stake out the fields of action that an individual has, interacting with media and for the means of media appropriation. Explicit similarities need to be found. However, it is important for researchers as well as for practitioners to understand these similarities as a means to knowing about the subjects' media-literacy. For this, the approach is not just crucial for practical work – because didactic methods or content can be adapted – also it can be profitable for media-science in general whenever research is done on, into or using target groups. Media appropriation as subject-orientated and media-orientated point of view can be more reflective about the contexts of people, than age. Overall, it makes sense to focus on similar capitals instead of or additional to aspects defined by the people's age because the elderly are not a silver target group, they seem to be gaudy in their media appropriation.

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Older Adults and Email Use: The challenges facing interface co-design

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ABSTRACT

Faced with a rapidly ageing society and with constant technological progression, studies focused on fostering communicative action and reducing social isolation have become increasingly relevant. This paper presents a proposal of a graphical interface for an asynchronous communication service aimed at older adults, which was tested in different user contexts – both in Portugal and the United States of America. The main aims of this study are to determine to what extent the participation of older adults in the development of an email service can influence its usability and the design of a simplified interface. The usability results provide consistent clues as to how the technical development of an email service for older adults should proceed. We conclude that we should not design an email interface so as to be completely different from existing ones. Rather, we chose to improve its usability and simplify the entire process of using an email service.

KEYWORDS

asynchronous communication, computer-mediated communication, email, older adults, usability

Introduction

The impact of ICT (information and communication technologies) is not the same in all sectors of society. At the macro social level, for example, access depends on social, historical and organizational variables within the personal context of each individual. At the micro social level, the impact on the family, viewed as an organization, will also differ for each of its members, whether they are parents, children or grandparents. These differences are the result of specific variables, in constant flux, acting on each individual's history, and in the particular context of each individual's development (Lima 2010). It is widely agreed that an ageing population is exposed to greater vulnerability because of biopsychosocial changes associated with individual ageing (Pires 2008; Xie 2008; Bengtson et al. 2009; Brossoie, 2009; Pfeil, Zaphiris, & Wilson 2009; Saxon, Etten, & Perkins 2015). It should be noted that this is a heterogeneous process and various types of health loss and maintenance cannot be neglected. The importance of involvement in physical, mental and social activities in order to maintain and restore individual functions in older adults is generally accepted (Guerreiro 2005; Vaz-Serra 2006).

Facilitating access to social, cultural and leisure interaction is thus seen as a necessity (Santos & Paúl 2006). But considering the low levels of academic education in the elderly population (>65 years old) (Espanha 2011) and the rapid development of ICT (Cziko & Park 2003; Hu, Wood, Smith, & Westbrook 2004; Boyd & Ellison 2007; Kim, Kim, Park, & Rice 2007; Xie 2008), the factors that appear to mostly affect older adults' use of the Internet and ICT are interface design (Pfeil et al. 2009; Ferreira, 2013) and the inherent limitations of ageing (see table 1) (Pires 2008; Xie 2008; Pfeil et al. 2009).

Online environments should, therefore, be developed to reflect the characteristics of this particular public, as well as the amount of resources that they are able to use on the Internet. It is thus necessary to promote the digital inclusion (Guerrieri, Bentivegna, & Meliciani 2010; Zickuhr & Madden 2012; Prendergast & Garattini 2015) of this age group through interfaces, which enable equal and fair access to digitally available content.

To ensure that suitable senior interfaces are appropriately conceptualized, it is important to understand the consequences of changes in age-related interaction with computers and digital environments. Table 1 outlines these potential changes (Sales & Cybis 2003; Preece, Rogers, & Sharp, 2005; Czaja & Sharit 2013). An appropriate understanding of these factors helps in identifying specific elements that can be introduced during the development of communication services, particularly in interfaces.

The coherent treatment of both the content and design of an intuitive interface can contribute to the inclusion of a greater number of users, for reasons of access and ease of use.

Several studies demonstrated that email is still the most predominant communication service used by older adults online (Czaja & Lee 2001; UMIC 2010; Madden 2010; Zickuhr & Madden 2012; Morrison & Barnett 2013). The Pew Research Center report (Zickuhr & Madden 2012) indicates that 53% of American seniors use the Internet or email. Different modes of CMC (computer-mediated communication), specifically voice chat, online forum and IM (instant messaging) – in an older adult context – are used for different purposes. Voice chat is predominantly used to talk with participants and share topics such as music preferences. According to these users, in this context, they form a sense of belonging and a social connection, facilitating bonds of fellowship and, occasionally, emotional support (Xie 2008). Similar studies (e.g. Wright 2000; Kanayama 2003) highlight the manifestation of supportive relationships among seniors. In turn, the online forum serves the purpose of informative support to help participants resolve issues with the computer. IM services facilitate and foster positive intimate relations (Gross, Juvonen, & Gable 2002; Hu, Wood, Smith, & Westbrook 2004). The main reason for these results is that IM ensures genuine interaction while protecting privacy.

Regarding how older adults feel in a technological society, they are often excluded both in terms of access and ownership. Associated with the biopsychosocial changes caused by age are the lack of access opportunities, resulting from economic variables, the functionality of technology and issues regarding its design and usability (Nielsen 2002; Preece et al. 2005; Rice & Alm 2008; Pfeil et al. 2009; Czaja & Sharit 2013). It is important to provide research-based guidelines for website design that consider the main interaction difficulties in order to make websites more user-friendly for all adults (Nielsen 2002; Bosman et al. 2002; Zaphiris, Ghiawadwala & Mughal 2005).

Such guidelines would include the following topics: 1) the number of stages or steps needed to complete a task should be reduced to minimize the risk of error; 2) the clickable area should include the largest possible surface; 3) body text should use a 12 or 14-point, non-condensed sans-serif typeface; 4) the layout of the website should be simple and straightforward to ensure that people understand what follows next; 5) interaction between links should include feedback strategies, with color and font used to differentiate between active and visited links; 6) design strategies should facilitate the recognition of areas and tasks to do, focusing always on consistency and clearness; 7) regarding colors, there should be a good contrast between letters and background color, and in terms of seeking information, there should, whenever possible, be a domestic search engine within the website itself.

Older adult users tend to rely on external stimuli and environmental support (offered by the system) for information and memorizing correct answers, so it is important to implement a project that focuses more on the relationship between stimuli and learned responses. Furthermore, the options provided in the interface must be compatible with user profile; scrolling should be avoided as should keeping more than one window open; error messages, manuals and help should be provided; the use of icons and symbolic representations are also of particular importance and must be recognized and understood by users without any ambiguity or misunderstanding.

Changes resulting from the human ageing process	Senior Interaction - Computers and digital environments
Visuals: difficulties in discriminating details of nearby objects; difficulties in reading; decrease in chromatic and light sensation; 'eye strain', which decreases the quality of near vision; physiological degenerative processes in the retina.	The decreased ability of vision can affect HCI (Human-Computer Interaction) when: the size of the fonts available in the software and / or digital information environments are very small; there is no significant color contrast between text and background, there is insufficient lighting for reading, the hardware does not have sufficient technology to support the technologies that the software needs.

Table 1 Human ageing and interaction with computers and digital environments
(Sales & Cybis 2003; Preece, Rogers & Sharp 2005; Czaja & Sharit 2013)

Changes resulting from the human ageing process	Senior Interaction - Computers and digital environments
Hearing: gradual decreases in hearing ability, buzz, attention difficulties in cases of environmental noise or group conversations; low tolerance for high volume and high intensity sounds.	The decrease in hearing ability can interfere with HCI when: the sounds provided by software and/or digital information environments are not presented clearly, there is no easy or available resource to increase/decrease the volume; videoconferencing sounds, for example, have some shortcomings: there is no possibility to hear the sounds because of the overlapped noise of the surrounding environment.
Physical: Problems of osteomuscular and muscular order.	Affects HCI in the use of physical aspects of interaction (I/O device's hardware ergonomics).
Attention: difficulties in divided attention, *e.g.*, decreased ability to pay attention to several things at once.	Interferes with HCI when seniors need to activate selective attention among many options, as well as when various elements are displayed and users cannot pay attention to all the elements; for example, various text and image deals in an electronic shopping environment.
Perception: decreased ability to find figures or shapes embedded in complex patterns; decline in the ability to recognize fragmented or incomplete objects.	Affects HCI when seniors do not recognize/perceive mixed and/or fragmented elements such as text, images and sounds.
Memory: Salient changes related to secondary memory, or the short-term memory.	Affects HCI when seniors fail to memorize the features they just accessed.
Learning: related changes in attention, perception and memory.	Interferes with HCI when seniors cannot properly use the cognitive processes of attention, perception and memory, impairing learning.
Language: related to the production and reception of language with regard to reading, speaking and listening.	Affects HCI when seniors cannot use sensory systems related to vision and hearing for language processing.
Problem solving, planning, reasoning and decision-making: related more with the proper individual than seniors in general.	Interferes with HCI when seniors cannot handle errors in the use of software and/or digital information environment, use advanced search options to find specific information because of overloading graphics and/or text reasons.

Table 1 Human ageing and interaction with computers and digital environments
(Sales & Cybis 2003; Preece, Rogers & Sharp 2005; Czaja & Sharit 2013)

Therefore, studying and developing ICT services for senior users, as proposed in this paper, is of utmost importance for communication among older adults. Knowledge of ICT and using computers is still something new for many in this age group, but the incentive to learn more is getting stronger (Nugent 2007; Hernández-Encuentra, Pousada, & Gómez-Zúniga 2009) and the situation is changing.

The present study was designed to present a proposal for a graphical email interface for older adults – online communication area of the SEDUCE project (www.seduce.pt) – and provide new knowledge for future research in this area. It seeks to fulfill the following objective: to determine whether the participation of older adults in conceptualizing an asynchronous communication service (email) – participants may engage in the exchange of ideas or information without the dependency of other participants' involvement at the same time (Mitrea & Mitrea 2010) – can have an influence on its usability, with particular regard to the effectiveness and efficiency of its components and the satisfaction of its users.

Material and methods

The email service was developed at two Private Social Welfare Institutions (IPSS A and IPSS B) in Aveiro (Portugal), and at a public library in Maryland (USA) between December 2011 and October 2012.Participation criteria included individuals who were (i) aged over 65; (ii) motivated towards using ICT; and (iii) of normal cognitive status (dementia screening conducted by the Mini-Mental State Examination, validated in Portugal and USA). All participants signed a consent form. Table 2 outlines participants' characteristics (age, gender, years of schooling and frequency of computer use).

In order to better understand the participants' context, a questionnaire was conducted regarding these older adults' use of CMC services and computers. It is important to determine how often and where they normally use these services, whether they do so alone or not, and what activities they perform. This data was collected with a survey by questionnaire applied to all 14 seniors. Table 3 details the use of CMC services by the seniors involved in the interface design of an asynchronous communication service.

As noted, the present research pertains to the online community communication area of the SEDUCE project and presents the evaluation phase of this service. Project researchers Simões (2011) and Fonseca (2011) jointly conceptualized the first interface of an email service for the SEDUCE research project, and the seniors at IPSS A tested this first prototype. In the participatory design process, Simões (2011) used the card sorting technique while Fonseca (2011) applied the PICTIVE technique.

Summary of participants' characteristics

Code Name	Age	Gender	Years of Schooling
IPSS A (Aveiro)			
CS	80	F	6 years
JB	77	M	3 years
JR	85	M	4 years
MD	80	F	4 years
MM	79	F	4 years
Public Library (Maryland)			
BH	81	M	9 years
CB	72	F	9 years
DB	75	M	6 years
HC	69	M	4 years
MT	78	F	6 years
IPSS B (Aveiro)			
AC	79	M	5 years
AF	88	M	4 years
JF	76	M	4 years
NC	69	F	7 years

Table 2 Participants' characteristics

(age, gender, years of schooling and frequency of computer use)

In accordance with the guidelines for the development of appropriate Web interfaces for older adult users (Bosman et al., 2002; Nielsen, 2002; Redish & Chisnell 2004; Zaphiris et al. 2005), the most significant issues for the visual and interactive design of email are: avoiding drop down menus and scrolling; tutoring tasks; clear confirmation pages; letter size; clickable items that are easy to target and hit; and contrasting text and background colors (Bosman et al. 2002; Nielsen 2002; Zaphiris et al. 2005; Simões 2011; Ferreira, 2013).Table 4 outlines where the tests took place and the number of participants in the three prototype versions.

Using the contextual design method, we opted to carry out tasks in the three versions of the prototype-mail, focusing on the context of each user's specific use of the service (Beyer & Holtzblatt 1999; Preece et al. 2005).

The second phase of testing took place at IPSS A and in a public library in Maryland and the third phase of testing was once again undertaken at IPSS B. The researchers used an observation grid to record the results. Data was subsequently interpreted and applied to a newly organized version of the prototype, which included the identified needs. The contextual design process thus involved first reaching an understanding through the contextual inquiry phase – by gathering information about the context of users' use of the service, following a set of predefined tasks in accordance with the

goals set – and then co-designing work to improve the prototype according to the information obtained.

Overview of participants' use of CMC services and computers

Code Name	Computer Use Frequency	Alone/ Accompanied	Where?	Principal activity	Other activities
IPSS A (Aveiro)					
CS	Every 3 days	Accompanied	IPSS	Write	Use email; search for information
JB	Every 3 days	Accompanied	IPSS and home	Write	Use email;
JR	Every 3 days	Accompanied	IPSS	Write	Use email; search for information
MD	Every 3 days	Accompanied	IPSS	Write	Use email; search for information
MM	Every 3 days	Accompanied	IPSS	Write	Use email
Public Library (Maryland)					
BH	Every day	Alone	Public Library	Use email	Read news
CB	Every 3 days	Alone	Home	Use email	Write; read news
DB	Every 3 days	Alone	Home	Find Job	Search for friends; Play
HC	Every day	Alone	Home	Write	Use chat and email; search health information
MT	Every day	Alone	Home	Write	Play
IPSS B (Aveiro)					
AC	Every 3 days	Accompanied	IPSS	Write	Use email
AF	Every 3 days	Accompanied	IPSS	Write; use email	Read news
JF	Every 3 days	Accompanied	IPSS	Write	Use email
NC	Every 3 days	Accompanied	IPSS	Write	Use email

Table 3 Overview of participants' use of CMC services and computers

Prototype interface layout	Test site		Number of participants
1st version	IPSS A (5 seniors)		5
2sd version	IPSS A (5 seniors)	Public library in Maryland (5 seniors)	10
3td version	IPSS A (5 seniors)	IPSS B (4 seniors)	9

Table 4. Test site and number of participants in the three prototype versions

For the development of the prototype, an initial objective-oriented preparation was necessary, which required the formulation of a structured script of actions and observation. The actions contemplated: (a) read a new message; (b) reply; (c) compose a new message; (d) choose and add contacts; (e) read messages already read and; (f) read deleted messages.

Throughout all these steps, older adults had complete freedom to suggest changes.

Results

The interaction between the seniors and the first prototype[1] – first phase of testing – (Figures 1, 2, 3, 4 and 5) indicated the following observations and subsequent changes:

i) in the input area of the email interface (Figure 1), the clickable area to open messages should include the largest possible surface, including a photo, name and subject (Bosman et al. 2002; Nielsen 2002; Zaphiris, et al. 2005). The test participants rarely used the 'view' button to open messages. They clicked throughout the area that identifies the message (picture, name, subject, date); in the same window, the 'next' and 'previous' buttons to view more posts did not work. It was, therefore, necessary to consider an alternative to scrolling (Bosman et al. 2002; Nielsen 2002; Zaphiris et al. 2005);

ii) the participants had no difficulty in interacting with the 'read new message' (Figure 2) and 'reply' fields (Figure 3);

iii) in the 'write new message' field (Figure 4), no individuals wrote the subject of the message. When asked to explain this, they said that they were not aware of its presence and questioned its importance. For technical email reasons (content needs to be written), the subject area is required, so suggestions were requested. The use of the word 'title' was suggested as an alternative to "subject" and prevailed;

[1] All the profile photos used are not from real participants.

iii) in the 'choose contacts' field (Figure 5), the strategy of simulating a paper ballot (like political ballot vote) worked well. However, when selecting multiple contacts, the participants did not remember whom they had already chosen. The 'accept' button to validate selected contacts did not work either.

Figure 1. Interface layout of inbox area, 1st version

Figure 2. Interface layout of the 'read new message' area, 1st version

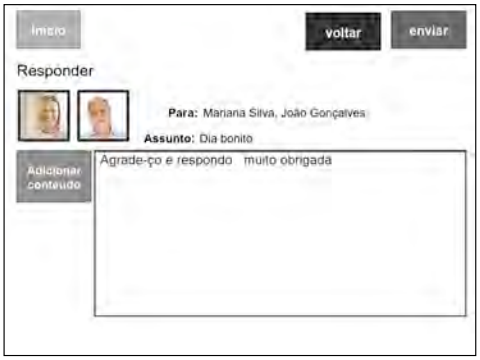

Figure 3. Interface layout of the 'reply' area, 1st version

Figure 4. Interface layout of the 'write new message' area, 1st version

Figure 5. Interface of the 'select contacts' area, 1st version

After taking these findings into account, the interface was co-designed. The evaluation of the second version of the prototype by the group of older adults in Aveiro – second phase of testing –, (Figures 6, 7, 8, 9 and 10) produced the following findings:
i) in the input area of the email interface (Figure 6), the participants realized there were six messages (because of contextual information identifying the number of new messages) but only four were visible. However, they did not use the scroll. They underlined that they did not understand the concept or its presence;

ii) in the same window, Figure 6, they did not understand the meaning of the 'old messages' folder;
iii) once again the participants had no difficulty interacting with the 'read new message' (Figure 7) and 'reply' fields (Figure 8), maybe because the feedback was not adequate;

iii) in the 'write new message' field (Figure 9), the participants did not know where to write the subject. Contextual information may be necessary or a name change must take place;

iv) in the 'choose contacts' field (Figure 10), participants failed to proceed with the task, after having chosen contacts. This may indicate that the 'has chosen' button, which gives continuity to the task, requires review. The format should be simple and easy to follow so as to ensure that users understand what comes next (Bosman et al. 2002; Nielsen 2002; Zaphiris et al. 2005).

Furthermore, evaluation of the second version by the group of older adults from Maryland produced the following findings:

i) in the input area of the email interface (Figure 6), the placing of 'already read' messages in a new folder complicates the tasks. If a participant would like to read the message again, he/she has to go to a new folder, which only complicates matters further. In addition, messages that have not been read are highlighted differently, so it is not necessary to create another index separator in the upper right corner of the interface as in Figure 6;

ii) the use of different terminology confuses the user. The participants suggested that in the 'choose contacts' field (Figure 10), the problem of the term 'has chosen' can be solved if it is replaced by 'compose message' or 'write message'.

After collecting this data, reorganization of the graphical interface of the email was carried out in order to create a third version. The next evaluation phase was carried out while the email service was being integrated into the online community (under development within the SEDUCE project). Figures 11, 12, 13, 14 and 15 represent the graphical interface of the email service tested with seniors at IPSS A and IPSS B – third phase of testing.

Both evaluation groups shared the findings of the tests applied to this third version. They demonstrate only that the scroll design did not work. Regarding the scroll problem, during the last session, the participants suggested putting triangular shapes on the top and bottom of the bounding box, to metaphorically represent the standard directional arrows to scroll emails in the inbox.

Figure 6. Interface layout of inbox area, 2nd version

Figure 7. Interface layout of the 'read new message' area, 2nd version

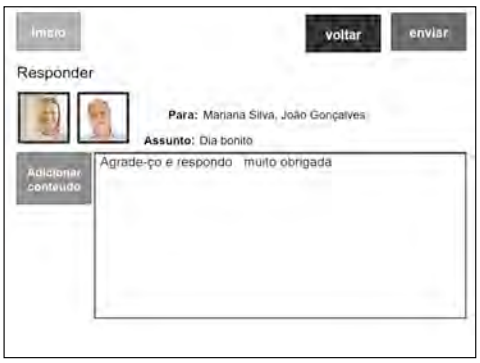

Figure 8. Interface layout of the 'reply' area, 2nd version

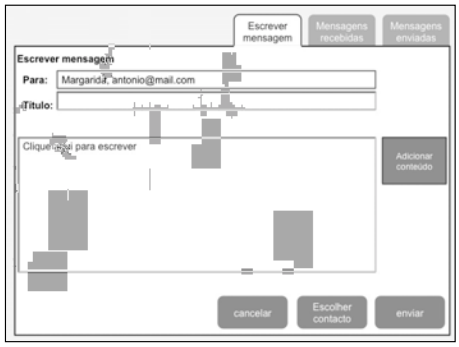

Figure 9. Interface layout of the 'write new message' area, 2nd version

Figure 10. Interface of the 'choose contacts' area, 2nd version

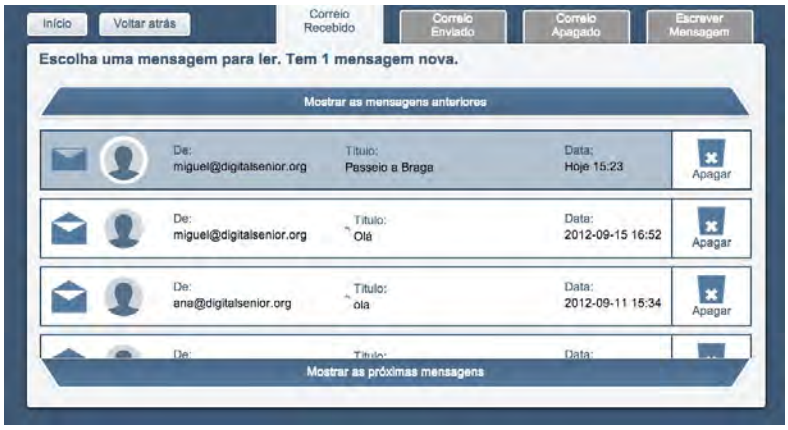

Figure 11. Interface of the input area, 3rd version

Figure 12. Interface of the 'read new email' area, 3rd version

Figure 13. Interface of the 'reply' area, 3rd version

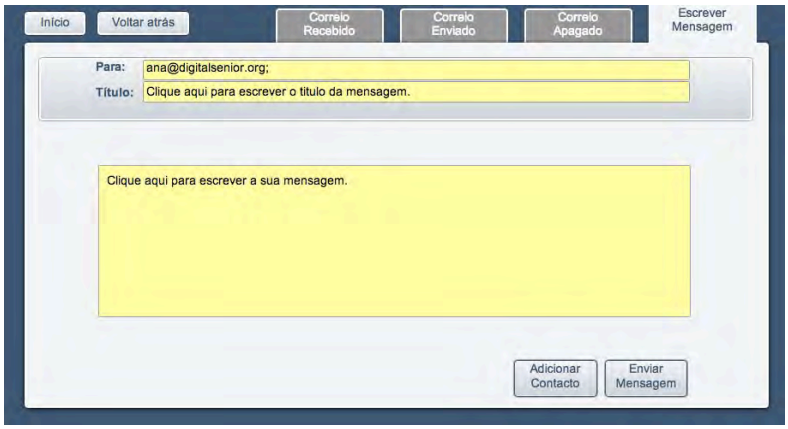

Figure 14. Interface of the 'write new message' area, 3rd version

Figure 15. Interface of the 'choose contacts' area, 3rd version

Specification and evaluation of the global usability of the email service

According to ISO 9241 Part 11, to specify or measure the usability of a Communication Service, or any other product, it is necessary to identify its goals and values of effectiveness, efficiency and satisfaction. The purpose of an asynchronous communication service is to provide the user with a simplified and user-friendly interface to receive and send messages/emails.

Regarding the purpose of the present research, to understand whether the participation of older adults in the development of an email service can influence its usability, the usability findings from the development group were compared with those from the evaluation group. The test session was conducted by a scripted task, and involved participants at IPSS A and IPSS B, who were members of the development and evaluation groups, respectively. At IPSS A, the evaluation took place on September 11th and 18th and October 2nd of 2012, in sessions lasting about 40 minutes. At IPSS B evaluation sessions were carried out on October 11th and 18th of 2012, each one of them also last-

ing 40 minutes. Results were recorded with the support of an observation grid, audio-visual recording and monitoring of activities using *Screenium* screen capture software.

The email service was evaluated according to the criteria of effectiveness (number of tasks completed successfully and number of errors), efficiency (time to complete the task and number of clicks) and satisfaction (ISO 1998). To evaluate the email service, the participants were instructed to perform the specific tasks shown in Table 5.

Task Number	Description
T1	View messages
T2	Reply to incoming messages
T3	Compose a new message
T4	Select and add contacts
T5	Read messages already read
T6	Read deleted messages

Table 5. Summary of tasks

Figures 16, 17, 18, 19 and 20 show the results of the evaluation.

Overall, when comparing the results obtained from the development and evaluation groups, it appears that, although the evaluation group successfully completed more tasks and produced fewer errors (greater efficacy) in performing these tasks, an increasing amount of time and clicks are required (lower efficiency), but never in a different manner. Two members of the development group did not complete one of the tasks while four participants in the evaluation group completed all the tasks successfully (Figure 16). Participants in the development group made seven errors at various stages in tasks 1, 2, and 3. Participants in the evaluation group committed five errors. Participants in neither of the groups committed errors in tasks 4 and 5 (Figure 17). The errors made were concerned with the writing of the message title, use of the scroll and conclusion of the tasks. The average time spent by the participants in the development group (time = 30min 20s) was less than for the evaluation group (time = 35min 10s) (Figure 20).

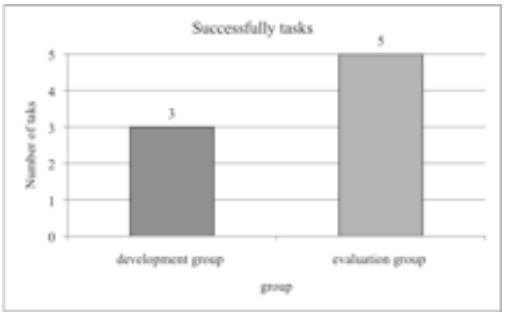

Figure 16. Number of successfully completed tasks

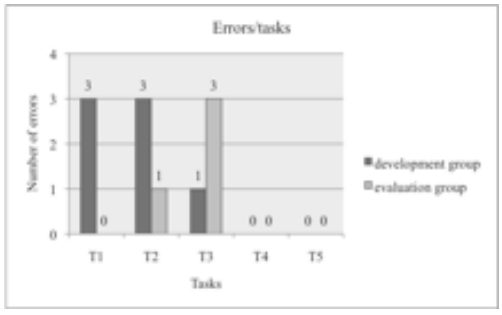

Figure 17. Number of errors per task

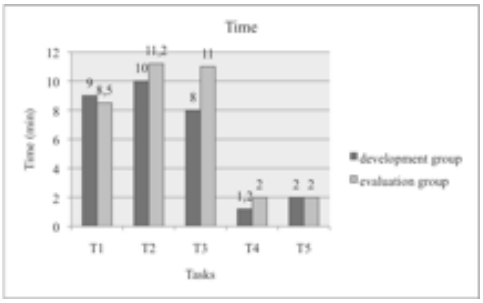

Figure 18. Time spent per task

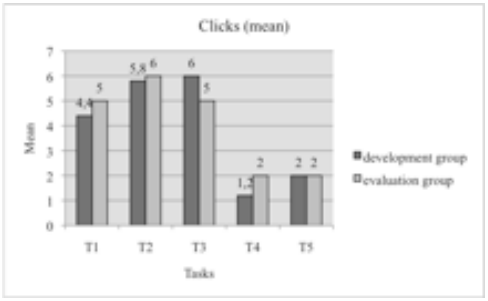

Figure 19. Mean of clicks per task

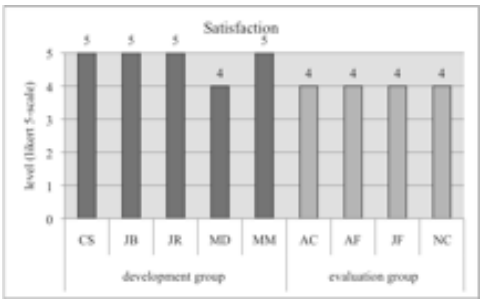

Figure 20. Level of satisfaction

For more successful and effective task achievement, it would be necessary to make a total of 21 clicks in all the tasks: five clicks in the first task, six in the second, seven in the third, one in the fourth and two clicks in the last task. The first task can also be successfully completed in six clicks and the fourth with two clicks, although it is well known that the lower the effort in accomplishing the task, the greater the efficiency (ISO, 1998). Only one of the participants in the development group completed the task with the optimal number of clicks to achieve maximum efficiency, whereas in the evaluation group, two participants managed the same accomplishment (Figure 19).

Since it is a subjective satisfaction-oriented evaluation, each participant's performance has an impact on the final results presented. Given its subjective nature, evaluating participants' satisfaction (Figure 20) suggests that the level of satisfaction with the use of the prototype is high in both groups. However, it is noticeable that in the development group, the satisfaction is higher. Four of the five participants in the development group reported being "fully satisfied" with the prototype (likert 5-scale) whereas those in the evaluation group indicated they were "satisfied" (level 4 on a scale of 5).

Discussion and conclusion

This paper has presented an overview of the development of the graphical interface for an asynchronous communication service, email, co-designed for/with older users and incorporated in the SEDUCE project's senior online community – miOne (www.mione.pt). This study reveals that older adults' limited ICT experience and their

lack of technical know-how can limit their critical thinking and, consequently, ability to come up with solutions.

Older adults in Maryland readily criticized the prototype, possibly because they frequently use ICT and email. Although older adults from Aveiro had more difficulty in expressing their opinion, they contributed significantly to the development of the prototype. Their lack of academic schooling allowed for greater questioning and reflection on what was presented to them. It was found that better practices are needed to enable older adults to participate in CMC. For example, interaction with seniors should be an iterative process that avoids the use of technical or formal language. Its purpose must, moreover, be clarified and seniors need to know that their performance is not being evaluated. In addition, they need to be given time to reflect and express their doubts and opinions.

As a developmental approach to services or products for older adult users, the contextual design (with co-design) process has proved to be a promising technique. Bearing in mind the limitations associated with the individuals participating in this study, and considering their low level of education and limited experience of ICT use, the contextual design option, that considered a co-design approach, allowed them not only to overcome difficulties but also to identify important clues for the future development of services and products for senior users. Some of the findings are corroborated by research by Nielsen (2002), Bosman et al. (2002) and Zaphiris et al. (2005) while this study contributes with the following recommendations:

• Language should be adjusted according to the users' characteristics, considering the particularities of the senior participants in this study, namely, their low level of education and lack of experience in using ICT. An example is the need to replace the titles of the fields for subject and for writing and composing the message;
• Contextual information should be supplied in the bounding box of messages describing features of different fields;
• The use of horizontal and vertical scroll bars should be avoided.

The results of measuring the effectiveness, efficiency and satisfaction of the evaluation group, according to statement of ISO 9241-11, are consistent with the results of the development group. The participants in the evaluation group were able to successfully complete more tasks and while they committed fewer errors, they took a long time to accomplish tasks.

The number of clicks is higher in the evaluation group but the difference is justified by the fact that completion of tasks necessarily requires more clicks than if they were not completed. Furthermore, the level of satisfaction for participants in the development group is higher than for those in the evaluation group, although both are high. Perhaps because the simple fact of participating in activities, as co-designers, different of their daily life routines, made them feel satisfied, with a sense of contribution to a project,

and this interfered with the results of the interface evaluation, namely the satisfaction dimension.

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Seniors, iTV and content about Social Services: Clarifying the relationship

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ABSTRACT

Over the years, television has been seen as a means of enriching human development. The technological evolution of this means of communication has led broadcasters to deliver more attractive and diversified contents. Hence, traditional broadcasting has evolved from the traditional passivity to the granting of a participatory role for viewers, creating a new paradigm – Interactive Television. Senior citizen viewers are great consumers of television and represent a considerable portion of people, who can take advantage of the interactivity potentialities. Most of the time, changes in social services take too long to reach senior citizens due to their technological, sensory or cognitive limitations, which tend to occur with the aging process. In this exploratory study, the research team aims to find principles for the development of content about social services, considering iTV potential and the limitations of senior citizens' viewers. To accomplish this goal, the research team developed audiovisual content, videos regarding social services with different approaches on technological aspects. The evaluation of its effectiveness was by means of inquiry with direct questions on the material that was showcased.

KEYWORDS

senior citizens, interactive television (iTV), digital television, social services

Introduction

The aging of the world's population is a reality (Ferreira 2013, 15). The progress in economy and health sectors, as well as the overall improvement of living conditions as comfort, hygiene regulations and safety have made possible one of humanity's greatest desires: longevity (Ferreira 2013, 15).

This experimental procedure seeks to accomplish the forge of a new link that would be of use to connect senior citizens even further to the new technology world, in this case study, interactive television**.** The goal of this case study is the adaptation of audio visual contents for senior citizens bearing their necessities in mind. To achieve that goal, the research group established research guide-lines that consisted on a three part analyses and data retrieving process: i) showcasing two videos with the same theme, edited in different ways, to senior citizens; ii) questioning the viewer's opinion of both contents showed with a set of pre-made questions; iii) analysing the data retrieved.

Since the goal of this experimental procedure is to enlarge the role of new technology in senior citizens lives, we have to keep in mind the process of aging and what it implies. With the passing of time, most senior citizens reduce their role in society and the role they take in a community, which can create a feeling of loneliness and self-doubt (Silva 2014, 65). This feeling may have effects on their social inclusion, family environment and also on their physical and mental health. (Teixeira 2010, 4). Aging is a process that occurs in many different ways and not all persons handle it in the same way, it depends on each individual perspective and capabilities in the cognitive and visual aspects, etc. (Silva 2014, 65).

There are physical and physiological changes in the eye structure, which can lead to visual impairment, light sensibility, color blurring, and night vision loss. Hearing loss is also a factor on the aging equation (Cardoso 2009, 1). There is sometimes a considerable loss in sound perception, normally in the lower sound range. These two constants, hearing and visual loss, when put together can lead to social loneliness and depression. (Silva *et al*. 2013, 145).

Another characteristic that is associated with aging is the movement limitation on the shoulders, something that can appear silently and painlessly (Silva 2014, 66). Due to this limitation, some senior citizens have to spend more time in doing day-to-day tasks, such as: getting dressed, driving, showering, getting to sleep, among many others. This lack in their movement range, associated with hearing and visual impairments, may become a risk of social exclusion that can lead to depression.

Besides physical lacking, there are also the cognitive problems associated with the aging process. It is known that older people can have difficulties in assimilating new information and their reasoning ability is visibly worn out and reduced. Globally, senior citizens have a bigger difficulty in performing some tasks better than others and are more susceptible to loss of information. Beyond the scientific breakthroughs, Silva (2014, 1) states that technological discoveries are constantly changing the way society is organized and evolves. Television is one of those discoveries (Silva 2014, 1). Mass communication translates itself into information through social media, particularly television, newspapers, magazines, cinema, radio and, of course, the Internet. Although the Internet has a prime role in society, television is still arguably the greatest means of entertainment and communication. Therefore, television is a means of communication that can leverage interpersonal relations and social cohesion. (Abreu 2007, 23).

Wolton (1996, 16) reports that television:

> '(…) is an object that incorporates conversation. We speak with each other, and then speak with others away of our homes. In this scenario it is an indispensable social bond in a society where individuals tend to be frequently isolated, and sometimes lonely. It is the only activity that can create an equivalent link between rich

> and poor, young and old, urban and rural lifestyles, a link between learned and non-learned.'

Based on this argument, we can assume that television is seen as a path to construct opinions and to enhance knowledge by the masses. It influences our way of dealing with life in terms of values, traditions and the overall norms (Abreu & Branco, 1998).

McLuhan's perspective (1962) enhances the revolutionary power that was generated by television and also classifies the means of communication as hot or cold. On one hand, hot means are channels that have high definition standards and are focused on any social target and have the tendency to be very visual, logical and private. On the other hand, cold means have the tendency to be more aural, intuitive and emotionally engaging (Santos, 2003). Hence, McLuhan states that television can be defined as an aural and immersing path that demands participation and involvement. We can work while listening to the radio, but the same situation cannot, with certainty, occur while watching television, because we can do both activities but there is no guarantee both can be done well.

In the television market scene, as in many other communication and social media, the spotlight has been shadowed by the influence of the Internet, either by the existence of web portals (with on-going live feeds of information, radio live streams or contests via live stream) or also by the capability to disseminate personal information content (Silva 2014, 1). The emergence of personal computers and the dissemination of the Internet originated a big technological revolution that with the development of its infrastructure enabled the creation of new services and shifted the already existing media of television to this digital paradigm – Interactive Television (Silva 2014, 1).

In 2011, the Portuguese channel 'Independent Television (TVI)' was pioneer in implementing interactive television with experimental sessions, via cable television. The user started to have access to thematic and complementary information, the control over visual frames and visual angle or even polls (Violante *et al.*, 2015). TV programs that offered viewers the control over an interactive character by using their phone, such as "Hugo" (the first interactive Portuguese TV program) are examples of a simple use of television interactivity. The constant technological evolution together with the constant demand of new services by the TV industry that release them, have potentiated the need and the producing of new services, for instance social security information services and medical information services.

From this point of view, the pertinence of this investigation is indisputable, since aging is a global phenomenon that has induced several deep changes in developed societies. These changes challenge younger generations to develop multiple gerontechnologies (gerontology + technology), which are technologies that meet the senior citizens expectations and needs in their "natural environment". They can help senior citizens people in their social anxieties and general needs.

Many of the developed technologies have as goal the social inclusion and integration of senior citizens in the already existing communities, enlarging their social network and increasing their levels of well-being and digital literacy. In this context, television rises as an effective way to induce and support dialogue and conversations between people (Abreu 2007, 23). Additionally, as television is arguably the closest and most familiar means of communication to the senior citizens, television can be seen as a more advanced technological service for this population segment. Hence, it can be an important support to older people through various features, such as reducing the distance between them and the social service location, hence bringing them the information without the need to transport to the location.

This idea was to be obtainable trough all kinds of social services, such as support of services that promote social interaction and collective viewing, the provision of medical information or, as is the goal of this proposal, the information dissemination on public services relating to society. (taken from: project proposition +TV4E, 2015). Besides the important investment of public administration in disseminating the public and social services, these services are still not correctly thought out and drawn to the needs of this specific public (senior citizens). Due to this fact senior citizens people are commonly found in a disadvantaged position, for not knowing how to access public services and assistances they can benefit from (e.g. medication discounts, medical appointments, etc.), thus, there is often a high informational dependence on their caregivers' network.

In this framework, this paper aims to enumerate a set of variables and principles for the orientation of audiovisual content that respects the specificities, needs and expectations of the target audience, so senior citizens may be fully informed about the numerous changes that occur in social services, in a short period of time.

Guidelines

In a first trial, a preliminary test was carried out with 8 senior citizens (ages between 55 and 75). It was possible to confer some of the aspects described in Fisk *et al* (2009), Zaphiris, Ghiawadwala and Mughal (2005) and in Caldas (2014, 33) for the conceptualization of audiovisual contents: (a) Avoid decorative fonts (example: Gothic, Rosewood and Old English), so the use of Arial or Verdana is advised; (b) Reach a contrast of 50:1 (example: black text on white background or vice-versa); (c) Avoid the movement of text (*scrolling);* (d) Use only 140 words per minute (pausing in speech is essential); (e) Consider the contexts in which male voices (ads) and female voices (for drawing attention) are used; (f) Minimize the background sound and eco and; (g) Avoid background music while audio content is delivered.

In this context, the following recommendations should be equally held in mind (Czaja & Sharit, 2012), due to their prior use in recent studies with the same target audience: (a) Do not overcharge the senior's visual channel, so replacing the use of text for narra-

tion is recommended; (b) The speed of narration should be slow or moderate, thus not overwhelming the cognitive capacity of the senior is recommended; (c) Avoid audio information overload; (d) Not overcharging the senior with visual and audio information simultaneously; (e) It is imperative that the narrator's voice transmits calm as well as preventing possible fears; (f) Using narration to direct the user's attention to visualization of given information and; (g) Avoid formal conversation.

Research Process

In order to understand the relationship between the best approaches to create audiovisual content and senior's specific requirements, a set of interviews and tests with a target audience was carried out. This exploratory study will be helpful to inform the next steps of the +TV4E project.

During the evaluation and data retrieving process, it was necessary to create 2 different groups with 8 elements in each one. Each participant was asked to evaluate two videos on the available topics. In this case, the available topics were: 1) the process of billing validation through the eFatura portal; and 2) the driving license regulated by a points system. After the topic selection, which was dependent on the senior's interest, a brief questionnaire about their personal data, age, professional career and the structure of their family was presented.

After that, the interview proceeded with questions related to television habits, types of audiovisual devices existing in the family household and the overall level of digital literacy. To characterize digital literacy, the metrics defined in Digital Literacy European Commission Working Paper and Recommendations from Digital Literacy High-Level Expert Group (European Commission, 2008, 5) were used. Thus, it is necessary to know if a person was able to: (a) Copy or move a file or a directory; (b) Use the copy and paste tools to copy or move information within a document; (c) Use arithmetical formulas in a spreadsheet; (d) Compress files; (e) Connect and install new devices (for example: a printer); (f) Use the search engine; (g) Send an e-mail with attached files; (h) Post messages on discussion groups, forums and chats; (i) Use the Internet for phone calls; (j) Share movie files and music files with other users; (k) Create a web page and; (l) Develop a software app using a programing language.

In short, a person has high digital literacy if is able to execute five or more of these tasks, medium digital literacy when is able to execute three or four and low digital literacy when is only able to execute up to two of these tasks.

Then, the physical capabilities (auditory and visual) of the participant were tested, as well as their cognitive capabilities (memory and concentration). To evaluate physical capabilities, we asked the participant about their physical limitations. Furthermore, it was informed to all who took part in the study on the importance of truthfulness of their answers, and that only the authors would have access to them, they were then informed

of their anonymity towards the general public. On the other hand, to evaluate the cognitive capabilities we carefully studied their speech looking, indirectly, for faults this based on previews studies.

It was important to perceive which social services the senior had more interest in obtaining information on, what were their greatest doubts and how, normally, they get information about social service changes (for example: did you know that in 2016, the age of retirement went up to 66 years and 2 months. If is the case how you got hold of this information through television, newspapers and radio?). Before this, it was imperative to perceive the level of difficulty that the senior had in utilizing this kind of media and to try and minimize the changes to it the least as possible.

Upon finalizing the first part of the questionnaire, already described, it was time to present the first video. After the video we proceeded with a set of questions related to the contents showed. This set of questions was repeated after the visualization of the second video, to enable the adequate evaluation of the video construction. The evaluation contained questions regarding the font size (if it was readable or not), the image quality, audio quality and if the video was or was not appealing. Secondly, it was necessary to know if the information was clear to perceive, or if there were issues that created difficulty in the video perception and the understanding of information, such as sound volume (too high/ to low), text reading (font too big/small), video length (too long/short), and the use of complex words.

Some questions about the presented video were then asked in order to test the concentration capability and the clarity of the delivered information. Lastly, the senior had to choose between the first and the second video, justifying his choice.

Simultaneously, the standardized scale SAM (Self-Assessment Manikin) (Lang, 1980) was used as a complement. The SAM is considered a non-verbal, pictograph and simple application test. The SAM scale presents three pictographically scales and each one is composed of a sequence of five or nine drawings, graded in intensities, which represent different levels of emotional dimensions (pleasure, arousal and dominance). The pleasure dimension is represented at one end by an unhappy and bored figure and at the other end by a happy smiling figure (Leão 2012, 20). Thus, the classification of arousal goes from the state of relaxation or ease (represented by a relaxed figure with closed eyes) to excitement (represented by an activated figure with wide and open eyes) (Leão 2012, 69). Lastly, the dominance dimension is represented at one end by a controlling figure and at the other end by a completely controlled figure. (Leão 2012, 28). The SAM is an instrument that can be used in countries of different cultures, since it is free from cultural influences and does not make use of language. (Bradley & Lang 1994, 58).

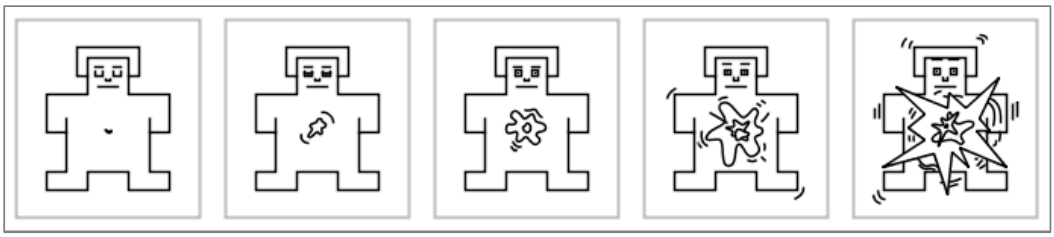

Figure 1 – Simplified SAM scale (Lang, 1980)
http://irtel.uni-mannheim.de/pxlab/demos/index_SAM.html

Data analysis

In this section we will analyse the set of results of the first eight questionnaires. In this sample there were three male and five female participants, with varied ages: (a) Two persons aged between 55 and 59; (b) Three persons aged between 60 and 65 and; (c)Three persons aged over 65.

The results showed that six of the eight subjects had only other adults in their families, and the remaining two had adults and children. Hence, the study showed that none of the subjects lived independently. In terms of television habits, when asked: "How much TV hours do you watch daily?" with the selection of answers being: i) never; ii) less than an hour; iii) between one and two hours; iv) between two and three hours; v) more than three hours; it was observed that this sample of senior citizens watched one or more hours of television per day. When asked: "Where do you usually watch television" with the selection of answers being: i) living room; ii) bedroom; iii) kitchen; iv) other; the retrieved data showed that the spaces chosen to watch television by this sample were the living room, the kitchen (either alone or with company).

Seven of the eight participants had computers or other mobile devices (i.e. smartphones and tablets) but hardly or never use the computer. Even though seven of the participants have computers or other mobile devices, among the eight persons, six of them never use the computer; and we argue this can be explained by a low technological literacy. Regarding the physical conditions of our sample, none of them had hearing impairments that influenced the test and only 5 had higher visual impairments.

Concerning the cognitive capabilities, none of the eight participants has difficulties understanding and making themselves understood. Regarding memory and concentration capabilities, only one person had problems in concentrating and memorizing. This would be a concern in retrieving all the fundamental aspects of the audio visual materials showed, since if the subject were to be distracted the essential differences in the audio visual materials would not be noted. This would also reflect an important problem in the senior citizen's daily life, in gathering information and perceiving the world around him.

All of the suggestions given about social services were considered important by the participants, however medical compensations and appointments were also considered important, as well as medical fees and insurance.

The results showed that, normally, the majority of the sample received information about the social services changes on television, confirming that the television is the greatest informative "friend" for the senior community. From the participant's point of view: 4 considered it a hard process to obtain information whereas 3 considered it an easy process to obtain information. It is important to note that the three participants, who found television an easy way to access this kind of information, have family members working in social services.

After dividing the group of eight senior citizens in two groups of four, we attributed to each group a theme (each theme included two videos with different approaches), which were: 1) the process of billing validation through the eFatura portal; and 2) the driving license regulated by a points system.

On the first theme, two videos were firstly presented to the subjects and after its visualization they answered a questionnaire. Whilst in the second group, which evaluated the second theme, participants had questions about the topic before watching the videos-and afterwards they confirmed their answers through the questionnaire.

On the first theme, the greatest difficulties shown by the senior citizens were the font size and the use of complex words. After watching the videos none of the four persons in the group were able to reproduce the information that the videos presented. Consequently, we can conclude that it is a difficult process, because the content was showcased as a tutorial, and therefore would oblige the senior citizens to have a certain level of literacy to replicate them. Usually, this kind of procedure is done by their relatives. When they were asked to choose between videos (same theme, different approaches), two senior citizens chose one and the other two senior citizens the other, but all gave the same justification: "More enlightening.".

On the second theme, the process was inverted: the subjects firstly were asked about the theme and afterwards they watched the videos. Regarding this question, although only two senior citizens had a driving license, all of the senior citizens responded correctly to the major points of the matter. Thus, all the four senior citizens knew the day on which the new system of driving license went active (1st July of 2016), and how many points would be attributed to each driver (12). They also knew, where to check the points that they had ('Portal de Contra-ordenações Rodoviárias').

When the senior citizens were asked about the quantity of points that would be removed if they drove under drug or alcohol influence, two of four participants did not know the answer. One of the senior citizens, who did not know the answer, had driving license and the other did not. Based on these results, we conclude that the senior citizens can be

informed about a subject that is not directly related to them through the use of television programs that are carefully designed with their ages in mind. When participants were asked to choose between the two videos (same theme, different approaches), all of the senior citizens chose the same video, because they thought it was more simple, enlightening, contained more information and considered also that the presence of a presenter helped to understand the video. The senior citizens preferred a human presence rather than an animated presence.

Conclusions

Throughout this project, we firmly believe that interactive social services would become a 'must-have' in the lives of senior citizens, for all the benefits it brings to them. As we stated and defended, an easy access to this kind of services would be a good mechanism, since the majority of senior citizens do not interact with the Internet, due to the reasons stated before-hand, this applying to the senior citizens in this study. Reinforcing these services will contribute to the welfare and overall social inclusion of older people, and potentially facilitate the mental well-being of senior citizens. As shown in the results of this studied group of senior citizens, we can dismiss the part of information given by Internet, because all of the subjects in the study admitted not to use it and, consequently, they do not obtain any social service information by it.

We can conclude that physical and cognitive problems are of the most importance for the learning capabilities of senior citizens. The participants considered it easy to obtain information on the social services when their family was connected to those services; but the opposite was reported by those who did not have workers on social service in their family. For those senior citizens, to obtain such information is currently incredibly difficult. Even if some social services are not directly connected to their welfare, older people, as highlighted by this study, like to be informed of the overall new information of the remaining services. Participants suggested they like to be aware of all the new changes that are happening in society, so they can create a conversation about it with others. As shown in the results of this studied group of senior citizens.

Considering the classification of audio visual materials, it is noted that senior citizens in our study only had two standards, they liked it and considered it good or they hated it and considered it bad. When we applied the SAM (Self-Assessment Manikin) to further explore this issue we obtained neutral results on this matter (the participants always selected the same drawing). It is also important to refer that when two videos were showed one after the other, the participant had a tendency to grade and classify them on equal terms, even if they were substantially different at visual and audio level.

We can also state that senior citizens do not give too much importance to the graphical part of a product (its appearance), if the information is clear. The overall impression of an audio visual material can be justified by the proximity with the researcher, taking in mind the researcher's feelings on the matter. Even if the matter at hand is beyond their

knowledge, participants reported that the information on the video was well distributed and understood.

As the researcher engaged with the senior citizens it is to be noted that, if a researcher has the need to make a questionnaire to senior citizens, they should select a questionnaire of open response, because senior citizens have the tendency to choose whatever the researcher states, even if the statements are false. This is in regard to the research group's experience with this project.

The creation of audio-visual materials regarding these social services has to be properly done in order to meet the needs of senior citizens. Some useful principles that we found as an outcome of this study are: good sound quality, good image quality, using simple words that are easy to understand and taking into account the font size (over 18). Using a human presenter, also, assisted knowledge transfer and senior citizens as a result are more likely to better understand the topics that are presented.

With the examples that we mentioned in this project, we can then conclude that in this research sample of senior citizens, there is still a big dependency of other to conclude many tasks, in several situations as was showed.

The results show that there is potential in this methodology's guide-lines for the development of audio visual contents for this target audience, to be integrated and considered for the daily dynamics of television. Therefore, with the development of this subject we hope that Private and Non-Private Organizations will take these "guidelines" in mind in order to reach better this special population segment.

Acknowledgements

The research leading to these work has received funding from Project 3599 – Promover a Produção Científica e Desenvolvimento Tecnológico e a Constituição de Redes Temáticas (3599-PPCDT) and European Commission Funding FEDER (through FCT: Fundação para a Ciência e Tecnologia I.P. under grant agreement no. PTDC/IVC-COM/3206/2014).

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Communicating public and social services through iTV: Promoting older adults' quality of life

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ABSTRACT

As the demographic transition occurs in a global scale, dealing with the consequences of population ageing has emerged as a critical task to modern societies. This has led government entities to pay more and more attention to seniors' concerns, limitations and needs. A deep understand of old citizens, especially those unfamiliar with Internet and smartphone technologies, is also a challenge in order to enable them to fully benefit of the Information and Communication Technologies (ICTs). In the light of this issue, personalization and user-centred approaches involving older adults in all development stages may be the key for higher levels of user engagement with such ICT solutions as the interactive television (iTV) platform reported in this paper (+TV4E). The +TV4E is an on-going research project conducted at University of Aveiro, Portugal, based on a social inclusion approach, aiming to take benefit from the television viewing dynamics of senior viewers, by interweaving short and personalized adverts related to public and social services alongside regular broadcast contents. The platform is being designed with a user-centred approach featuring the integration of assistive technologies and multiple multimedia communication channels. In this paper, a system architecture to deliver the informative contents is stated and a discussion of the potential social impacts of providing such platform is presented.

KEYWORDS

interactive TV; public services; older adults; quality of life; user-centred design

Introduction

Population ageing is a global trend that in the past 50 years has led to a significant inversion of the population pyramid in developed societies. In this context, older adults' limitations and needs at physical, cognitive or psychological level, may be partially or fully resolved by technological solutions that can improve older adults' quality of life.

Often represented in the media as a phase of decline, frailty and dependence, old age is also a period where changes beyond the physical and bodily alterations are experienced. Changes in social roles may create opportunities for social participation (Cornwell, Laumann, and Schumm 2008) and personal achievement, given that, especially with retirement, these citizens have more available time for various social activities. Hence,

seniors are increasingly seen as contributors for social development, due to their capacity to act for the good of themselves and their communities according to policies and programs which should involve all levels of society (Walker 2015).

With specific needs and more free time due to retirement, seniors tend to use the TV as the primary medium of information and entertainment. A number of studies emphasize the high usage and familiarity of this device in several countries. As an example, reports from the United Kingdom (Ofcom 2015) and Brazil (SECOM 2014) show similar results: people aged 55 and over have an average daily TV viewing of 5 hours, and this time tends to increase with age. In the particular case of Portugal, TV is a rather popular communication vehicle to people of all age sectors, and in particular to the elderly, reports show that 99% consume TV content at least once a week (Martins 2016).

Though a number of solutions based on TV technologies for seniors have already been created, developing solely innovative and advanced technological solutions is not enough. Rather, it is necessary to develop solutions that overcome the usual drawbacks of solutions already available for older adults. At this point, participatory techniques are valuable tools for achieving higher acceptance levels of technological solutions due to their main focus on end-users' limitations and needs (Newell 2003). The personalized and customized presentation of iTV services, interfaces and contents, can be achieved by User-Centred Design (Abras, Maloney-Krichmar, and Preece 2004) strategies, which involve potential end-users in all development stages. The collaboration with these users, especially during the preliminary, modelling and validation phases, enables greater involvement and greater compliance with user requirements.

In this context, given the difficulty of access to information regarding public services and recurrent scenario of info-exclusion in older adults, the +TV4E is an on-going project which aims to develop and evaluate a platform for delivering and presenting personalized informative content regarding public and social services tailored for the Portuguese older adults through iTV. These contents will be inserted along the linear TV broadcasted transmission to be presented according to short interruptions, which may be turned down or re-scheduled by users. These pieces of highly valued informative content (e.g. bulletin health services, discounts on medications, community meetings notifications, called for voting on participatory budgets, etc.) will be tailored, taking into account specific users' characteristics and interests in order to better adapt to users' expectations, needs and limitations. The +TV4E main objectives are to minimize the impact of an ageing population on developed societies and to contribute to the improvement of the quality of life of the older adults, in the form of greater autonomy, independence, social integration and empowerment.

Background

The increase in human longevity is a cause for celebration, but it also brings up challenges and concerns for societies (Foster and Walker 2013), as demographic ageing has had great economic impacts on public health and pension systems. In several countries, public investments are being rearranged in order to comprehend the demographic and epidemiological changes observed in the last decades (Powell and Chen 2012). As an example, the European Union expenditures applied for treatment of chronic and age-related diseases are accountable for 83% of all money spent on the health system as a whole (Wiederhold, Riva, and Graffigna 2013).

This situation led Wiederhold, Riva and Graffigna (2013) to propose structural shifts in current health systems in order to create participatory models where citizens are responsible for their own health care. Thus, treatment approaches would be based on individuals (citizen-oriented) and not based on general medical conditions or specific diseases (disease-oriented), resulting in higher engagement of citizens in their medical treatments. Wiederhold and his colleagues (2013) also point out the use of positive technology as a solution to implement these approaches. The concept of positive technology (Riva et al. 2012) focuses on the use of technology to improve the personal experience through strategies to motivate and engage users by enabling the expansion of public policies beyond traditional approaches. This concept is commonly applied by interactive TV services targeted at older adults, which, in turn, are covered in the next section.

Public services

The term ‘public service’ concerns any activity assigned by law to the State, performed by the government itself or through its representatives, in order to meet collective social needs (Di Pietro 1999). Thus, a public service consists of a set of actions and obligations delegated to public or private entities to fulfil collective interests and general welfare. Common roles of public services include promoting collective values, guaranteeing strategic security needs of citizens and providing health and education.

Governments have been using modern communication channels to spread their actions and to stay close to citizens as much as possible. Whether through social networking posts, promotional videos uploaded to YouTube, institutional websites and emails, or even advertisements on TV, the amount of published information related to government functions (e.g. information regarding health campaigns, calls for votes on participatory budgets, law changes notifications, etc.) has been grown enormously in the last twenty years. Many citizens, however, are not yet reached by this type of informative content, as they usually demand direct searches or previous registration with the communication channels. When considering older adults as a target audience, this informative content has limited reach, given that this public is often info-excluded (Amaro and Gil 2011).

In addition, broadcast media options, such as traditional linear TV or broadcast radio channels may be an alternative to reach older adult population as a whole, without requiring any direct information look-up. However, audience segmentation and lack of personalization are common challenges faced in these options due to the nature of these media. Lack of personalization in content advertisement makes this broadcasted approach less efficient and too expensive. Thus, using interactive TV technologies to collect and process user data to fulfill customization needs may meet the challenges posed by audience segmentation.

Interactive TV Services

With the addition of interactivity mechanisms to the traditional (analog) TV, interactive TV platforms are now a consistent alternative for providing services and applications targeted at older people, given the great familiarity of this audience with the TV set. This alternative seems even more feasible when considering the high penetration of interactive TV technologies on a global scale. According to longitudinal studies in 138 countries, Global digital TV penetration may reach 98% of television households by 2021 (Digital TV Research 2016).

In this context, many iTV services designed to improve the quality of life of older adults have been created. Stojmenova et al. (2013) developed the Med-Reminder, an Interactive TV service that aims to remind people to take their medicines accurately and in time. In addition, this service provides features to call a relative or a health professional in an emergency situation. Additionally, Vital Mind (Miotto, Lessiter, and Freeman 2009) and MindGym (Gusev et al. 2015) are some examples of iTV services that aim to maintain older adult's well-being; promote physical activities, interactive exercises and cognitive training; and slow down physical and cognitive losses that come with the ageing process.

Raij and Lehto created the Caring TV (2008), an iTV service targeted at older people that aims to promote greater independence, security and confidence by keeping older people at home and undergoing community or self-administered treatment for longer and thus avoiding premature hospital admissions. For designing the Caring TV service, older adults were taken as active partners, considering several aspects of their daily lives, such as their own knowledge base, skills, values and experiences. Thus, the authors decided to design and develop the Caring TV with direct participation of older people and health professionals through rounds of interviews and focus groups.

Similar health caring functionalities are present in the ElderCare iTV service (López-de-Ipiña and Blanco 2011), which also employs second screens and attached devices to monitor the health status of users even when they are not in front of the TV. Second screens may be used for extending iTV platform functionalities. Thus, Miyazaki et al. (2013) created the "Senior Cloud", a service to stimulate communication among the

older adults in Japan. In this iTV service, older adults could watch TV shows virtually together by chatting with the use of tablets and smartphones connected to the iTV platform.

The iNeighbourTV (Abreu, Almeida, and Silva 2013) is a SocialTV application (Oehlberg et al. 2006) that goes beyond the field of social relations and includes features to: (a) monitor older adults' daily activity; (b) provide weather information; (c) show medicine and medical appointment reminders; and (d) send alerts to health care professionals. In order to better characterize potential end-users, identify their needs and evaluate the usability requirements and interface, the iNeighbourTV was developed, using a participatory design methodology.

Recommender systems

In the context of the +TV4E Project, the concept of personalization goes beyond graphical user interfaces and aspects of interaction of interactive TV technology. This project aims to provide, via interactive TV, personalized informative contents based on older adults' needs, expectations and particularities. In the same way, Abreu et al. (2015) has proposed GUIDER, a second screen application for television content recommendation, which aimed at understanding and identifying the cognitive processes associated to TV content discovery based on user preferences. Considering the current context of content overload on linear TV channels, content recommendation is a valuable alternative to traditional EPGs (Electronic Program Guide) to support content discovery and effective information delivery.

The so called content recommendation systems comprise mechanisms to find suitable items from a large collection (Adomavicius and Tuzhilin 2005). The three main approaches used in these systems are: (i) based on content, in which recommendation has been previously consumed or viewed; (ii) collaborative, in which recommendation is based on content that has been previously consumed or viewed by users with similar profile; and (iii) hybrid, a mix of both content-based and collaborative.

Considering the existing content recommendation systems, Vanattenhoven and Geerts (2015) conducted a number of studies regarding the circumstances and viewing modes in home environment to understand how video and television programs are consumed at home. They mapped various contextual factors that determine the consumption of TV and video, such as users' schedules, mood, household structure, etc., to identify home viewing situations associated with each of these contextual factors. The results have led to valuable insights to existing recommender systems to enhance personalization according to home users' circumstantial aspects.

Personalization and content recommendation are key concepts for the +TV4E Project as it proposes a new television experience by transmitting personalized informative con-

tent regarding public services based on specific attributes of older people, such as geographic location, health status, occupation, preferences in consumer TV shows, etc.

The +TV4E project

The +TV4E project aims to develop a platform to deliver information about social and public services via interactive TV in a personalized and suitable way appropriate for older people. Thus, informative contents of several types and formats, such as sounds, videos and texts, are remotely generated and managed for further transmission according to user profiles which are built up according to older adults' viewing behaviour and socio-demographic attributes.

System architecture

The +TV4E project combines the traditional broadcasted TV with personalized informative contents regarding social and public services whilst focusing on the aspects of wellbeing and user experience in order to enrich the TV viewing experience of older people. The proposed technical solution (see Fig.) uses a client-server approach to deliver contents.

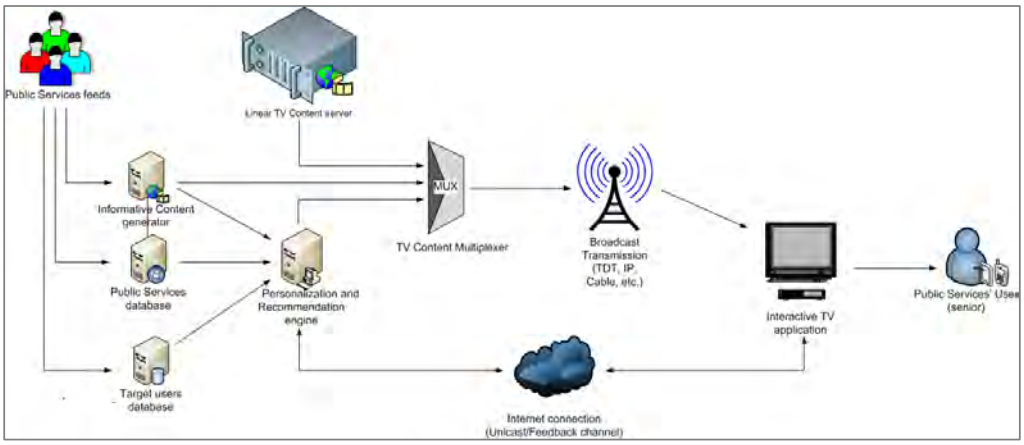

Fig. 1. +TV4E architecture.

On the client side, an Interactive TV application is designed to playback linear broadcasted TV content and informative contents in an interleaved manner. This application works in a way that the older person will receive a warning on TV screen stating that the linear transmission will be interrupted for a short time and that the informative content will be presented.

Afterwards, the transmission will be resumed and the TV viewing experience continues as usual. In addition to the information displayed on the TV set, the iTV application will enable the older adults to receive additional content on the topic through other platforms or services, for example via email or via second screens in a cross-media strategy. In

addition, if the older person does not want to have their TV viewing experience interrupted at a given moment the informative content may be cancelled or postponed for further exhibition.

On the server side, the following components are responsible for generating informative contents; maintain user's profiles and transmitting these informative contents both via broadcast and unicast flows[1]. Informative Content generator functionalities include the automatic generation of informative contents regarding public and social services as well as the maintenance of their respective metadata information according to Public Services feeds. This metadata information will be matched with user profiles by content recommendation algorithms to select older adults who might be interested in the respective informative content.

The Target users' database has socio-demographic data used to build up initial user profiles while the Public Services database has governmental information organized according to a taxonomy of public and social services available for seniors (e.g. health care campaigns, tax system dates notification, etc.). Proposing a proper taxonomy of public and social services is also part of the scope of +TV4E Project.

The Personalization and recommendation engine maintains all data regarding user interactions and viewing experience obtained via Internet connection (e.g. which contents were effectively exhibited, which ones were considered useful by the older user, etc.). By cross-referencing socio demographic information retrieved from the Target users database and governmental information retrieved from Public services database with data regarding user interactions and viewing experience, a characterization of target users will be processed, and users will be grouped and classified according to interests regarding social and public services, creating consistent user profiles. Based on these user profiles, the Personalization and recommendation engine will apply content recommendation algorithms for selecting which informative contents are suitable for each older person.

The TV Content multiplexer is responsible for merging linear TV content provided by the Linear TV Content server with informative contents selected for Broadcast transmission when this informative content is to be delivered to all older adults. On the other hand, if this informative content is suitable for a subset of users, an Internet connection will be used as a Unicast channel.

[1] In a Unicast transmission, information is addressed from a sender to a recipient in a point-to-point connection. On the other hand, in a Broadcast transmission information is addressed from a sender to all recipients of the network in a process by which this information is transmitted to many receivers at the same time.

Usage scenarios

The target audience of this project is Portuguese older population. This population is often very dependent on caregivers and has low literacy levels (Carrilho and Gonçalves 2004), which hinders their access to information related with public and social services. Moreover, having access to these kinds of services may be an even harder task due to physiological and cognitive limitations associated with the ageing process. The use of information and communication technologies by older adults may assist with some improvements in their quality of life, and television, particularly, has the potential to increase wellbeing and media literacy levels. For this reason, such a project offers an attractive opportunity for communicating information related to social and public services to seniors.

The +TV4E project consists of a technological development study with an enormous scientific potential. In Portugal, there is an increasing number of older adults, which, in turn, demands for the construction and implementation of social policy measures by taking into account their limitations and particularities. Furthermore, a lack of truly consolidated institutional practices centred on the older adults, considering their social, economic and cultural background makes this demand for technological solutions even more critical. Thus, this project focuses on this demand as it presents itself as an informational and social protection tool for the older adults.

Portuguese seniors constitute the segment of population who watch more television, which turns out to be their main leisure practice. As mentioned before, 99% of Portuguese households have television and older adults watch around 5 hours of television per day, on average (Martins 2016). Thus, television is the most valuable technological channel to deliver contents to this population segment, operating as an enabling medium of information dissemination. Therefore, TV can work as a basis for the development of an information platform about public and social services, which promotes better understanding of such services by the older population.

A simple usage scenario of the +TV4E project consists of delivering information regarding changes in the national incomes tax system (e.g. people over 66 years old become eligible for a discount by filling up a declaration form). This information can be sent to older people whilst they watch TV according to the following steps: a) On the TV screen, in a graphical overlay, a warning appears stating that an informative content will be presented shortly; b) If the user does not cancel the content exhibition (e.g. if the user does not press a remote control key configured to cancel the information content), the informative content will be presented while the main broadcasted content is paused for a few moments. c) After the informative content presentation the TV viewing experience continues and the main broadcasted content is resumed. d) Information regarding user behaviour and experience is collected and uploaded to server side.

These functional dynamics have some similarities with the Radio Data System (RDS)[2] but with some notable differences: i) in the technology support (interactive TV system) and ii) in the personalization strategy, which provides a context awareness feature to the system, since the informative contents are tailored according to user profiles.

Discussion

The present study is part of an early stage of the larger +TV4E project – a two-year action research project conducted at University of Aveiro, Portugal, which proposes a platform designed with a user-centred approach featuring the integration of assistive technologies and multiple multimedia communication channels. To achieve that, older adults are going to be recruited to take part in cycles of conceptualization, assessment and, finally, in field tests at their home environment in order to evaluate the real impacts of the +TV4E platform in the daily activities of seniors.

Defining a high-level architecture to deliver public and social services contents is a corner stone of this on-going project. The conception of this architecture enabled the authors to assess the platform implementation requirements along with the target users, which unveiled a set of concerns and problems for the upcoming cycles of implementation and validation.

Providing information to older adults is the main requirement for the platform. However, it is critical to find out the proper timing to do this, as good or bad timing may determine the openness of the users to receive the information provided. An algorithm processed by the Personalization and recommendation engine to define the most relevant moment for content delivery is under discussion. Also, the engagement of target users depends on the way the content itself is presented on TV screen. So, different approaches of interrupting the linear TV flow were envisioned for further validation along with the recruited users.

If defining *when* the content should be delivered is critical, select *what* will be presented is indispensable, imperative for the adoption of the solution. As recommender systems' performance depend heavily on the features used to characterize entities and contents, further studies will be focused on selecting a proper recommendation algorithm, categorizing older adults needs of information concerning public and social services, and defining the possible aspects to be considered by the recommendation algorithm. Contextual factors (e.g. physical condition of the user and what program is being watched during the content delivery) as well as user feedbacks (e.g. contents fully presented, classified as relevant by the users, etc.) may also be considered by the recommendation algo-

[2] Radio Data System (RDS) is a standard for sending small amounts of data through conventional FM radio broadcasts. Along with the audio, small amounts of text and data are transmitted with the radio signal. The information commonly transmitted is: station institutional information, radio program information, navigational and traffic information, time and date.
(https://en.wikipedia.org/wiki/Radio_Data_System)

rithm to strengthen the content selection. Furthermore, pre-processing techniques, training strategies, performance metrics, as well as platform's overall scalability, delays, and load aspects must be considered.

In addition, the efficiency of selected recommendation algorithm may be affected and lowered in multi-person households, as no user identification/authentication will be supported by the platform. However, considering that different persons usually watch TV in different times of the day, a multi-user profile may be applied to emulate a multi-user environment based on the different time spans of the day.

Finally, recruiting older adults from cities nearby, as well as keeping them motivated to collaborate is considered vital for the project success. Findings of later stages in the upcoming participatory design cycles are going to be reported at a later date and finally to conduct field studies with recruited older adults.

Conclusion

A series of initiatives in the research area are focused essentially on network communities development and health applications (Blackburn, Brownsell, and Hawley 2011). There is a lack of projects related to the access of social and public services to assist seniors in management of their financial, health and social dynamics. In this context, the +TV4E project aims to identify the needs of the Portuguese seniors with respect to information about public and social services and develop a platform targeted at seniors to disseminate such information.

Participatory and collaborative methods are being be performed all over the course of +TV4E project. However, since this paper reports a preliminary version of the system architecture, even before older adults have completed cycles of requirements assessment and evaluation, solutions to tackle older adults information needs, interface presentation of the Interactive TV application, and a decision for a proper algorithm for content selection are still being discussed by the authors.

Finally, this project aims to contribute to a better quality of life and wellbeing of users, in the form of greater autonomy, independence, social integration and empowerment.

Acknowledgements

The +TV4E Project is funded by the FCT (Foundation for Science and Technology) – Ref.: PTDC / CVI-COM / 3206 / 2014.
The first author would like to thank the Brazilian National Council for Scientific and Technological Development (**CNPq**) for providing a research productivity scholarship to support his doctoral thesis development (process 204935/2014-8).

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