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A nuanced understanding of Internet use and non-use among the elderly

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Abstract

This article examines explanations for both Internet use and non-use by older individuals. Older adults are often considered a homogeneous group with uniform reasons for Internet non-use, or when they are online, practising a uniform range of activities. The study gathered data concerning senior non-users through a national telephone survey. Data concerning senior Internet users were obtained through a nationally representative online survey. The findings suggest that although a substantial part of the senior Internet non-users live in surroundings that enable Internet uptake, they seem to be less eager or unable to do so. Important differences among senior non-users are based on gender, age, education, household composition and attitude towards the Internet. Differences among users were based on life stage, social environment and psychological characteristics. This article thus reveals that older citizens are a very diverse group in which some are more likely to be digitally excluded than others.

Keywords

Internet anxiety, Internet non-use, Internet use, literacy, older adults

Introduction

Internet access is now widespread in many Northern European countries. In the Netherlands, the rate is among the highest in the world; 97 percent of all people aged 16–75 have Internet access at home (CBS Statistics Netherlands, 2013). Of those with home access, only 2 percent never used the Internet. Age is strongly related to being

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online, 19 percent of those aged 65 and older lack access to the Internet at home in the Netherlands (in age groups 16–25, 25–45 and 45–65, these rates are 5%, 1% and 0%). In other countries, older generations are even less likely to be online; for example, in Britain, 51 percent of the older population do not have home access in 2013 (Oxford Internet Surveys (OxIS), 2013). Because the Netherlands is a country with high levels of general Internet diffusion, it provides a case study for understanding what the future situation might be with regard to older adults who are likely to be digitally excluded. We expect socio-cultural and socio-economic differences in Internet use to be more clearly articulated when the social norm is to be online and digitally engaged. In this article, we focus on a nuanced understanding of the older population (65+) because common research practice too often considers them as a homogeneous group with uniform reasons for non-use (Helsper and Reisdorf, 2013; Loos, 2012).

This article has two important contributions. The first contribution is the provision of a better insight into the explanations for Internet non-use among older adults. In the first study, we will investigate which factors are important predictors of having household Internet access, the availability of support, future Internet uptake and reasons for non-use. By doing so, the article addresses digital exclusion, that is, how important different factors are in explaining which older people are not online.

The second contribution is an investigation of older adults who are online. In the second study, we will examine which factors are important predictors of the extent to which older people (do not) undertake certain activities. That is, how important different factors are in explaining different types of digital exclusion. These factors potentially block online participation which might further marginalize older adults from modern society. During the last decade, research has indicated that significant inequalities remain in terms of the nature of Internet use (e.g. Chen and Wellman, 2005; Dimaggio et al., 2004; Van Deursen and Van Dijk, 2014). It is logical to assume that this is also the case among older users, which might be problematic because the Internet could potentially offer many benefits for older adults' lives (Blit-Cohen and Litwin, 2004; Morris et al., 2007). For example, Internet use does not require physical movement, thereby enabling maintenance of social networks that cross generations and include family members, friends or other persons at home (Blit-Cohen and Litwin, 2004; Nahm and Resnick, 2001). In addition, research has focused on how access to the Internet might help with health-related issues (e.g. Hesse et al., 2010).

The combination of the datasets in this article offers a unique opportunity to look at both divides and levels of disengagement among older adults, a population not often studied using this more nuanced two pronged approach. The two studies presented extend our knowledge about this population not just by describing these differences but also in terms of what explains these differences. The following research questions are explored:

1. *Which factors explain senior Internet non-users' differences in barriers to Internet use?*
2. *Which factors explain senior Internet users' varying levels of engagement with different online activities?*

After providing the general theoretical background to the study, we answer these questions by discussing the methods and results of both studies separately.

Background

Digital exclusion

One of the most common frameworks to look at Internet non-use is that of the digital divide. The framework posits that there is a societal gap between 'haves' and 'have nots' or between those who have access to Information and Communication Technologies (ICTs) and those who do not. Digital divide research describes which groups are most likely to be offline and has led to interventions aimed at providing Internet access for disadvantaged groups at community centres, libraries, schools and homes (Kuttan and Peters, 2003; Servon, 2002). In general, those groups who are disadvantaged in a traditional socio-economic sense were found to be most at risk of exclusion from the digital world as well. However, the general consensus is that the singular distinction between those who do and do not have access is not the best approach to understanding why people engage or do not engage with different digital platforms. Warschauer (2003) and Van Dijk (2005) warned that research needs to be designed around gradations of digital exclusion instead of simple Black and White divides if it is to inform policy and practice tackling the negative effects of being offline.

Several scholars have argued that better definitions of the field of research are needed, distinguishing independent and compound effects of different types of offline resources (such as one's social network), different skill levels and different types of engagement with ICTs such as the Internet (ranging from recreational to serious use; Helsper, 2012; Looker and Naylor, 2010; Witte and Mannon, 2010). Most descriptive studies focus on or show that a particular disadvantaged group is less likely to be online but do not take this one step further by looking at the variety within these groups. Qualitative studies are more likely to include this approach but do not have the methodological means to generalize their findings beyond the particular case study or individual participants. Therefore, there is a need to look in more detail at specific groups that are most likely to be digitally excluded. This article focuses on one such group – older adults.

Older adults Internet (non)use

Internet use is consistently negatively related to age, that is, the proportion of Internet users is smaller in older populations than in younger populations (e.g. Czaja et al., 2006). General population studies and qualitative research with older adults have identified several reasons for not being online. Most often, senior non-users are described in terms of demographics rather than asking them directly about why they do not use the Internet (Helsper and Reisdorf, 2013). Socio-demographics that are associated with older people's Internet uptake are gender, education and household composition (Helsper and Reisdorf, 2013; Millward, 2003; Morris et al., 2007). The latter is associated with social isolation which is more common among older people, and might be a partial explanation for why they are more likely to be offline. Socio-demographics, however, are not a sufficient explanation for non- or limited use of technologies (Curran et al., 2007; Eynon and Helsper, 2011; Helsper, 2010; Loges and Jung, 2005). Factors associated with more general social exclusion are just as, if not more, important. Several studies have asked the elderly directly about their reasons for disengagement and provide a starting point for

further investigation. Consistently mentioned are a lack of Internet attitude, feeling too old, a lack of Internet experience or Internet skills, insufficient time and high connection costs (Helsper and Reisdorf, 2013; Lee et al., 2011; Millward, 2003; Morris et al., 2007; Peacock and Künemund, 2007). In the current study, besides the mentioned socio-demographics, we take a closer look at the most named reasons for disengagement, namely, attitude, feeling too old and a lack of Internet experience. Furthermore, instead of considering Internet skills, we investigate the role of traditional literacy, or the skills of reading, writing and understanding texts. Traditional literacy can be considered a requisite for performance in Internet skills (Wilder and Dressman, 2006).

Internet attitude. Adapting the expression of 'have-nots', people who remain on the 'wrong' side of the digital divide because of motivational problems are increasingly referred to as 'want-nots'. Theories of technology adoption suggest that one's attitude towards the Internet is crucial to using it (Davis, 1989; Venkatesh et al., 2003). Nevertheless, it would be erroneous to attach the label choice to those who have negative attitudes towards the Internet and therefore decide not to use it. Attitudes towards the Internet are generally considered an important determinant of use, and disposition towards the Internet plays an important role in its uptake by older adults (Wagner et al., 2010), especially when they indicate fear or unfamiliarity with ICTs (Saunders, 2004). Holding negative attitudes about computers and the Internet is associated with computer and Internet anxiety, and attempts to minimize the time spent using computers and the Internet (Durndell and Haag, 2002; Rockwell and Singleton, 2002). In addition to dampening the extent of use, anxiety negatively influences patterns of Internet use (Meuter et al., 2003) and prevents minorities including older adults from accessing the Internet (Chaffin and Harlow, 2005; Czaja et al., 2006; Mayhorn et al., 2004; Rojas et al., 2004; Saunders, 2004). It is important to understand what independent relationship Internet attitude has in relation to Internet use among the elderly because it is one of the aspects that positive, guided experience with the technology might be able to tackle.

Feeling too old. Considering oneself too old (or being perceived as too old) might hinder the appropriation of new technologies considerably (Hawthorn, 2007). Age should, therefore, be included as a factor even when researching a group that is often piled together under the senior citizen label. Because the group of older adults spans an increasingly broad range of individuals, a senior's particular age should be accounted for in addition to their other socio-demographic characteristics (Lee et al., 2011; Schaie and Willis, 2002).

Internet experience. In explaining the limited use of the Internet by older adults, we add another variable that is not a direct operationalization of socio-demographic or socio-psychological characteristics of the individual: Internet experience. Experience is often considered when explaining Internet use (Schumacher and Morahan-Martin, 2001) and is a useful predictor of which activities people engage with online over and above characteristics such as age, gender, socio-economic status and social isolation (Howard et al., 2001; Zillien and Hargittai, 2009). Most evidence suggests that older adults engage in only a small range of activities (Loges and Jung, 2005), often aimed at communicating with family (Selwyn et al., 2005) and that this might be partly explained with their lower

level of lifetime experience with the technology. This is exemplified by a study which showed that older adults with more online experience report a lower level of risk aversion to the Internet than other mature users, which might affect the activities they undertake online (Reisenwitz et al., 2007). Older adults with limited Internet experience are likely to have not only low computer self-efficacy but also may have higher rates of computer-related anxiety, both of which correlate with slow technology adoption (Beckers et al., 2008; Czaja et al., 2006).

Traditional literacy. Although traditional literacy is a requisite for using the Internet, it is almost never incorporated in studies of digital inclusion (Wilder and Dressman, 2006). We consider the traditional literacy concept to be the ability to read, write and understand text, also framed under the umbrella terms functional literacy or fundamental literacy (Frisch et al., 2012). Functional or traditional literacy can be considered the basic dimension of all literacy concepts (Frisch et al., 2012). In European countries in particular, older generations are likely to have received fewer years of education and, as a consequence, show lower levels of traditional literacy compared to the general population. Research shows that the prevalence of lower traditional literacy levels increases with age (Dixon et al., 1993; Lott et al., 2001) and we know that reading, writing and understanding text continue to be important for using the Internet (Coiro, 2003; Wilder and Dressman, 2006). Having problems with reading or writing might therefore also affect the type of activities older adults engage in. Listening to music, for example, requires lower levels of traditional literacy than searching for information. Thus, traditional literacy might explain why certain older individuals are offline and why they are likely to undertake some online activities but not others.

Study 1: Non-users

Material and methods

Sample. The first study gathered data concerning senior non-users through a national telephone survey in the Netherlands. Random-digit dialling was used to produce a sample of the Dutch population aged over 65 years. Of the 4414 older adults that answered the call, 402 indicated that they did not use the Internet (9.1%), of which 221 (54.9%) agreed to participate and completed the full survey. This sample might not be fully representative of older non-Internet users, but 221 cases in a country with such high levels of Internet access (also see the high number of older adults telephoned) provide an interesting sample from which useful information can be extracted. See Table 1 for the demographic profile or the respondents.

Measures. Gender, age, education, household composition, Internet attitude and traditional literacy were considered as independent variables in the analyses concerning non-users. Internet attitude was measured by seven high loading items of the Internet Attitude Scale (Durndell and Haag, 2002). All items are balanced for the direction of response ($\alpha = .69$; $M = 2.89$; standard deviation (SD) = 0.51; 5-point Likert-type scale). Sample statements included, 'The Internet is dehumanizing to society,' and 'Life will be easier and faster with the Internet'.

Table 1. Demographic profile of older adults non-users ($N=221$).

	N	%
Gender		
Male	84	38.0
Female	137	62.0
Age		
65–70	61	27.6
71–75	54	24.4
75+	106	48.0
Education		
Low	119	53.8
Medium	67	30.3
High	35	15.8
Household composition		
Single	124	56.1
Living with others	96	43.4

Traditional literacy was measured by using a validated 11-item literacy scale (DeGreef et al., 2013; $\alpha=.94$; non-users $M=3.10$, $SD=0.40$; 4-point Likert-type scale). Sample statements from the study included, 'I have difficulties with reading and understanding information from my municipality' and 'I find it difficult to read and understand my telephone bill'. All items were read out aloud to the respondent after which they were asked how much the item reflected their personal situation by using a 4-point response scale: 1 (strongly agree), 2 (agree), 3 (disagree) and 4 (strongly disagree). Scores on the scale exhibited high internal consistency, as demonstrated by a Cronbach's α of .94. In the analyses, all items were recoded so that higher scores corresponded with higher levels of traditional literacy.

Dichotomous dependent variables in the first study were relying on others to perform a task online ($M=0.51$, $SD=0.50$), having household Internet access without using it ($M=0.46$, $SD=0.50$) and future Internet uptake. Respondents were asked whether they planned to start using the Internet in the future, after which they could respond with no or yes ($M=0.18$, $SD=0.39$). In the study, 10 dichotomous key variables of reasons for non-use were included. These reasons were no interest ($M=0.37$, $SD=0.48$), insufficient skills ($M=0.23$, $SD=0.42$), no need ($M=0.19$, $SD=0.39$), being too old ($M=0.16$, $SD=0.37$) and no time ($M=0.09$, $SD=0.29$). Less-mentioned reasons were high expenses ($M=0.05$, $SD=0.21$), health problems ($M=0.05$, $SD=0.21$), safety/privacy concerns ($M=0.03$, $SD=0.18$), untrustworthy information ($M=0.01$, $SD=0.12$) or let others do things for them ($M=0.01$, $SD=0.11$).

All items were read out aloud to the respondents during the telephone interview.

Data analyses. Hierarchical logistic regression analyses are used to answer the first research question. All analyses are conducted in IBM SPSS Statistics 21. On this dataset, two sets of logistic regressions were conducted to examine different aspects of Internet access and non-use as well as reasons for non-use among senior non-users. Originally,

Table 2. Logistic regressions non-user access, proxy use and future use.

	Household I nternet access	Asking others for help	Intended future Internet use
	Exp(B)	Exp(B)	Exp(B)
Constant	0.15	0.16	0.00***
Gender			
Male	0.44*	0.48*	0.82
Age (reference: 65–70)			
71–75	0.49	0.52	0.68
75+	0.27***	0.45*	0.24**
Educational level (reference: low)			
Medium	1.75	1.35	4.97***
High	1.40	2.00	5.19**
Household composition (reference: single)			
Living with others	2.39**	1.18	2.32*
Traditional literacy	1.04	1.04	0.98
Internet attitude	1.76	1.96*	4.47**
Nagelkerke R^2	*.18*	*.10*	*.27*
Chi-square	*30.31****	*15.83**	*37.76****

Base: Internet non-users ($N = 221$).
* Significant at the $p < .05$ level, **significant at the $p < .01$ level, ***significant at the $p < .001$ level.

we used two-step models to investigate whether effects of gender, age, education and household composition changed when adding traditional literacy, Internet experience and Internet attitude. Adding these variables did not change the original model; therefore, we only report the final regression analyses results.

Results

To examine different aspects of older adult's non-use, we looked at explanations for (not) using Internet access available at home, asking others for help in using the Internet and intentions to use the Internet in the future (see Table 2).

Of all older adults who do not use the Internet, 43 percent indicated having Internet access at home. Table 2 shows that non-users who have access at home are less likely to be male, more likely to be aged over 75 than aged between 65 and 70 and more likely to be middle and high educated non-users compared to lower educated older adults. Unsurprisingly, older adult non-users who live with others are more likely to have Internet access at home than those living alone. A more positive attitude towards the Internet is significantly related to having Internet access at home among non-users.

Of all older adult non-users, 39 percent indicated having asked someone else to do something online for them. Men are less likely to do so, as are older adults aged over 75 compared to those aged between 65 and 70. A more positive Internet attitude results in a higher likelihood of asking someone else to do something online for them.

Table 3. Logistic regressions for reasons for non-use.

Explanatory variables	No interest	No need	Too old	No skills	No time
	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)
Constant	9.22*	0.11	0.01**	0.14	0.06
Gender					
Male	0.99	2.43*	1.62	1.16	1.07
Age (reference: 65–70)					
71–75	0.93	0.60	2.07	1.47	1.00
75+	0.82	0.67	9.10**	1.18	0.38
Educational level (reference: low)					
Medium	0.86	1.19	0.68	0.93	1.74
High	0.66	1.43	0.25	0.76	4.38*
Household composition (reference: single)					
Living with others	1.10	0.64	0.36*	1.32	1.76
Traditional literacy	0.99	1.02	0.99	1.01	0.96
Internet attitude	0.42**	1.16	2.29	1.18	1.39
Nagelkerke R^2	*.06*	*.07*	*.28*	*.02*	*.12*
Chi-square	*9.44*	*8.83*	*37.83****	*2.27*	*11.73*

Base: Internet non-users (N = 221).
*Significant at the 5 percent level, **significant at the 1 percent level, ***significant at the 0.1 percent level.

Only 13 percent of the non-users indicated intentions to use the Internet in the future. Of the non-users that have an Internet connection at home, only 7 percent indicates a willingness to use it in the future. Among all non-users, the ones aged over 75 are even less likely to consider future Internet use compared to older adults aged between 65 and 70. The same goes for lower educated older adults. Older adults living with others are more likely to consider using the Internet in the future. A more positive attitude results in a higher likelihood of future Internet use.

We also examined the reasons given for non-use. Table 3 shows differences for the most important reasons for not using the Internet, which do not seem to vary greatly between men and women, except for the reason no need, which is more likely to be mentioned by men. Older adults aged over 75 are more likely to mention being too old than those aged between 60 and 75. This reason is also more likely to be mentioned by older adults who live with others. Non-users with more education are also more likely to mention 'not having time' as a reason for their disengagement. Traditional literacy does not seem to affect reasons for non-use. Internet attitude contributes negatively to not having an interest.

Study 2: Senior Internet users

Material and methods

Sample. For the second study, data concerning Internet users aged 65 years and over were extracted from a national online survey. Sampling and fieldwork of this survey were performed using PanelClix in the Netherlands. Respondents were recruited from an online

Table 4. Demographic profile of older adults users ($N = 258$).

	N	%
Gender		
Male	136	52.7
Female	122	47.3
Age		
65–70	115	44.6
71–75	93	36.0
75+	50	19.4
Education		
Low	80	31.0
Medium	112	43.4
High	66	25.6
Household composition		
Single	78	30.2
Living with others	180	69.8

panel of over 100,000 people comprising a highly representative sample of the Dutch population. Panel members received a small incentive of a few cents for every survey in which they participated. Panel members were e-mailed invitations to participate in the current study that explained the survey topic and the time required to complete. In total, 2600 people were randomly selected from the panel, with a goal of obtaining a sample of approximately 1200 individuals. Respondents were selected in three rounds to account for gender, age and educational level of attainment and to accurately represent the Dutch population. Several measures were adopted to increase the survey response rate. The time required to answer survey questions was limited to approximately 15 minutes. In addition, the online survey used software that checked for missing responses. A total of 1488 questionnaires were received, of which seven were rejected as incomplete. From the final population, a representative sample of 1481 respondents, the responses of 258 older adults were extracted for the purpose of this study (see Table 4).

Measures. Gender, age, education, household composition, traditional literacy and Internet attitude are measured in the same way as in the first study. Added to the analyses is Internet experience, measured by asking senior Internet users how many years they had been online ($M = 11.61$, $SD = 5.47$).

Dependent variables were as follows: time online, online activities engaged in and breadth of Internet use. Time online use was measured in daily hours spent online ($M = 2.97$, $SD = 2.19$). Online activities seniors engaged in were investigated by measuring 23 items on a 5-point frequency scale (1 = never, 5 = almost daily) and subsequently clustering these activities into eight categories based on principal component analyses with varimax rotation, explaining 58 percent of the variance: music and video ($M = 1.84$, $SD = 0.94$, $\alpha = .73$, highest loading item: 'downloading music or video'), shopping ($M = 2.57$, $SD = 0.77$, $\alpha = .69$, highest loading item: 'compare products'), news ($M = 3.38$, $SD = 1.42$, $\alpha = .74$, highest loading item: 'news services'), information ($M = 4.16$,

Table 5. Hierarchical linear model with time online and breadth of Internet use as dependent variable.

Explanatory variables	Time online	Breadth of Internet use
	β	β
Gender		
Male	0.16*	0.04
Age (reference: 65–70)		
71–75	−0.10	−0.06
75+	−0.12	−0.13*
Educational level (reference: low)		
Medium	0.07	0.09
High	0.02	0.10
Household composition (reference: single)		
Living with others	−0.11	−0.01
Traditional literacy	0.05	0.03
Internet experience	0.12	0.10
Internet attitude	0.21**	0.20**
R^2	*.11*	*.09*
F	*3.52****	*2.87***

Base: Senior Internet users ($N = 258$).
*Significant at the $p < .05$, **significant at the $p < .01$, ***significant at the $p < .001$.

SD = 0.79, α = .66, highest loading item: 'using search systems such as Google'), e-mail (*M* = 4.85, *SD* = 0.51, single item), health services (*M* = 1.21, *SD* = 0.44, α = .61, highest loading item: 'consult and treatment'), social entertainment (*M* = 2.04, *SD* = 1.02, α = .50, highest loading item: 'social network sites') and civic services (*M* = 1.83, *SD* = 0.51, α = .52, highest loading item: 'transactions with the government'). Breadth of Internet use was measured by counting how many of the 23 activities older adults engage in online (*M* = 13.35, *SD* = 3.40).

Data analyses. Logistic and linear regression analyses are used to answer research question 2 and are conducted in SPSS Statistics 21.

Results

Table 5 shows differences for time spent online and breadth of Internet use. Senior men use the Internet for more hours a day than female older adults. Internet attitude is positively related to the time spent online; those with more positive attitudes spend more time online. None of the other socio-demographic or socio-psychological variables was related to time spent online among senior Internet users.

Gender did not influence the range of activities that older adults undertook. However, older adults above 75 showed less variety in their Internet use compared to those aged between 65 and 70. Internet attitude is positively related to breadth of Internet use; those with more positive attitudes use the Internet for a broader range of activities.

Table 6. Hierarchical linear models with Internet usage types as dependent variables.

Explanatory variables	E-mail	Information	News	Shopping	Social entertainment	Music/ video	Civic services	Health services
	B	β	β	B	β	β	β	B
Gender								
Male	0.01	0.07	−0.04	0.14*	−0.27***	0.23***	0.16*	.05
Age (reference: 65–70)								
71–75	0.02	0.06	0.00	−0.08	−0.12	0.04	−0.02	0.02
75+	−0.17*	−0.01	−0.02	−0.14*	−0.02	−0.08	−.18**	.04
Educational level (reference: low)								
Medium	0.08	0.00	0.15*	0.06	0.09	0.02	0.10	−0.02
High	0.04	0.18*	0.26***	0.11	−0.10	0.03	0.12	.08
Household composition (reference: single)								
Living with others	−0.04	0.03	0.03	−0.05	0.10	−0.05	−0.11	−.12
Traditional literacy	0.03*	0.15*	0.02	0.05	0.01	0.10	0.03	.01
Internet experience	0.06	0.09	0.01	0.07	0.10	0.08	0.15*	.02
Internet attitude	0.14*	0.12	0.17**	0.21***	0.15*	0.19**	0.13*	.01
R^2	*.07*	*.12*	*.09*	*.11*	*.12*	*.13*	*.13*	*.02*
F	*2.10**	*3.79****	*2.76**	*3.54****	*3.84****	*4.07****	*3.94**	*0.68*

Base: Senior Internet users ($N = 258$).
*Significant at the $p < .05$, **significant at the $p < .01$, ***significant at the $p < .001$.

Table 6 shows differences in the type of activities older adults engage in online. Factor analyses explained in the 'Method' section identified eight different activities older adults more or less engage in. The use of e-mail is less likely among older adults aged over 75. Both traditional literacy and Internet attitude have a positive influence on e-mail use among older adults.

Using the Internet for information purposes is more likely among higher educated older adults. Furthermore, traditional literacy is positively related to information uses. News services are used more by older adults of middle and higher education compared to those with lower levels of educational attainment. Older adults with more positive attitudes towards the Internet use it more for news-related activities. Online shopping is more popular with male older adults, and less popular among older adults aged over 75. Internet attitude has a positive effect on this usage type. Social entertainment is relatively popular among female older adults. Also Internet attitude comes into play here. Using the Internet for music and video-related activities is more popular among male older adults. Internet attitude is also positively related to music and video activities. Civic services are used more online by male older adults. They are less likely to be used among older adults aged over 75. Both Internet experience and Internet attitude have a positive effect on using civic services. The use of health services does not have any significant

predictors and the variables entered into the model did not increase a prediction of use of the Internet for health purposes beyond what could be estimated by chance.

In other words, Internet attitudes were significantly related to the greatest range of Internet activities, followed by age and gender, and by traditional literacy and Internet experience.

Discussion and conclusion

This study investigated digital exclusion among older adult Internet non-users and users. We extracted a set of factors that emerged in other studies as being important for older adults Internet uptake. The small group of Internet non-users that exists in the Netherlands mainly consists of older adults aged over 65. By identifying important differences within both senior Internet non-users and users, this article demonstrated that it is overly simplistic to just consider either as a homogeneous group. Just like for other groups in the general population, the digital divide framework which discusses gaps instead of gradations or variations of inclusion cannot be applied to this group of senior citizens. Warnings by Van Dijk (2005), Warschauer (2003), Loos (2012) and others about the importance of considering the different explanations for digital exclusion and the wide variety in types of engagement that exist are by no means outdated. The results revealed that different types of older adults were likely to have different types of (dis)engagement with the Internet.

Regarding the first research question concerning senior non-users, the results of this study hint at what explanations there might be for exclusion. Important differences among older adults concerning Internet non-use are based on gender, age, education, household composition and attitude towards the Internet. Female senior non-users were more likely to have an Internet connection at home without making use of it, suggesting that among older adults, Internet use is a male-dominated activity. Not surprising, given that historically ICT-related occupations and skills are stereotyped as masculine (Cockburn, 1985; Margolis and Fisher, 2003). While recent studies of adults' Internet skills reveal no differences between men and women in performance tests, in self-assessments women are known to underestimate themselves (Van Deursen and Van Dijk, 2010). Stereotypically, men are considered good with technology, whereas women are not; this might hinder access for female older adults in particular, since they probably had more exposure to such values than younger generations. This confirms that among the older population, Internet use and non-use are still very much gendered, perhaps even more clearly than among other groups of Internet users (Helsper, 2010).

Older adults aged over 75 years consider themselves 'too old' for the Internet and seem to not see the point of engaging. Thus, they are a challenging group for policy makers who aim for full digital inclusion. Although high educated senior non-users are more willing to start using the Internet in the future, their uptake faces problems of a different kind: available time. This probably reflects their more active lifestyles. Of course, this could also be a reflection of what socially desirable reasons are among different groups of elderly non-users. It might be more acceptable for those with higher levels of education to say that they are busy and for those with lower levels of education it might be easier to blame their age and lack of interest. These older adults' stages of life, which is more than just age, and their general life course determine their reasons for disengagement. This variety among older

adults needs to be understood to be able to shape effective interventions around digital inclusion. Cognitive, behavioural or affective factors need to be emphasized differently to improve access to and use of the Internet for particular groups of older adults.

The results related to Internet attitudes show that it is vital that policies aimed at increasing older adults' digital engagement include creating a positive attitude towards the opportunities that Internet use brings. This study looked only at the independent effects of Internet attitudes after having controlled for other socio-demographic and social-psychological variables. It will be important to understand which groups of elderly non-users are most likely to have these negative attitudes. In other words, both the direct and mediation effects of Internet attitudes need to be taken into consideration in the future.

Regardless of an older adult's gender, age, education or attitude, their surroundings affect their Internet uptake. Older adults living alone do not learn about the Internet from partners or someone else in the household and are less likely to start using it in the future. More research is needed to understand the functions of use of the Internet by proxy in this particular population. Interventions to overcome digital exclusion by older adults should, in general, take into consideration that an older adult's digital disengagement can for a large part be attributed to social and psychological barriers rather than physical accessibility. In response to the first research question, we conclude that a substantial part of the senior Internet non-users live in surroundings that enable Internet uptake. Nevertheless, they do not seem to be eager or unable to do so, now or in the future. Further research should examine more closely how older adults' social surroundings affect their willingness to start using the Internet. This is an aspect of quantitative and qualitative digital inclusion research that is missing from most studies which tend to focus on individuals instead of household dynamics.

Our second research question asked about differences among senior Internet users. In the last decade, digital exclusion research has emphasized that access gaps may be closing, whereas other gaps such as differences in use widen (Chen and Wellman, 2005; DiMaggio et al., 2004; Van Dijk, 2005). The analyses showed that older adults use the Internet surprisingly often, although there were considerable variations. Similarly, several differences among older adults regarding the types of activities they engage in online were identified. This corresponds to the usage gap hypothesis (Van Dijk, 2005) which claims that Internet use reflects differential uses and activities in all spheres of daily life. Education is often considered the most important predictor of a digital exclusion (Robinson et al., 2003; Van Dijk, 2005). Highly educated senior Internet users are more involved in cognitive/knowledge enhancing activities of information and news. As in previous research, gender differences seem to conform to our traditional understanding of gender roles in society (Helsper, 2010; Selwyn, 2007): male older adults engage more in online individual recreational activities, while their female counterparts turn more to social activities. Older adults make use of the Internet for shorter periods of time, making less use of even basic activities such as e-mail and shopping. They hardly seem to engage with online civic services, which might be due to habit forming around the use of offline services and support (Van Dijk et al., 2008) or the decreasing lack of trust in technologies that accompany ageing (Godfrey and Johnson, 2009).

Besides affecting older adults' reasons for non-use, the social environment is also related to the amount of time senior Internet users spend online which increases when

living in a single household. This might be explained if the Internet is used to fight social isolation (Shapira et al., 2007).

This study also confirmed that traditional literacy cannot be ignored in relation to the Internet, which requires reading and cognitive processing of texts (after all the Internet is largely text based). Since informational use of the Internet is the activity most engaged in by older adults, traditional literacy is likely to affect their general Internet uptake. Furthermore, it seems that activities with significant offline benefits, such as the use of civic services, require more experience than other every day activities, such as information seeking. Offline older adults are heavy users of these services so it is worrying that skills and expertise limit older adults' engagement with services highly significant to them. As for non-users, attitudes towards the Internet were important for engagement with a variety of activities, suggesting that policies aimed at broadening engagement should also emphasize a variety of positive outcomes.

Again, we stress that older adults should not be considered a homogeneous group, even when they are online. Life course, including social environment and psychological characteristics, determines how the Internet is used. As for the general population, a digital divide approach which positions the elderly opposite younger groups without considering the variations within that group cannot be effective nor increase our understanding of the processes behind exclusion from the digital realm. Similarly, research that looks at different aspects of and reasons for non-use as well as the different types of ways in which individuals within this particular group interact with the Internet is vital to further the field of research.

Limitations and future research

This study has some limitations. Although the results of the study suggest that different types of older adults are likely to have different types of (dis)engagement with the Internet, a better theorization about what the processes are that explain these differences is still needed (Helsper, 2012). Furthermore, the study relies on self-reported measures and cohort data. However, it is reassuring that the findings of measures used in the study are consistent with previous work on older adults and the Internet. The reported explanatory variance of most regression models is moderate. This suggests that future research should investigate additional factors that can explain why older adults do not make use of the Internet, or when they do use it, can explain what activities older adults engage in. Based on our findings, we suggest the incorporation of variables that relate to the social environment of older adults. Qualitative research might provide a more in-depth understanding of the social interactions older adults engage in both offline and online.

This study investigated Internet non-use and use among older adults living in the Netherlands. The Netherlands has a very high household Internet penetration, predominantly broadband, thereby facilitating digital citizenship, or the ability to participate in society online (Mossberger et al., 2008). It would be insightful to replicate this study in other countries that reveal much lower levels of Internet access among older adults. Questions that need to be answered are whether in different national contexts identical predictors for non-use and differences in use arise, and subsequently, whether policies should focus on different aspects in these countries.

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