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Increasing inequalities in what we do online: A longitudinal cross sectional analysis of Internet activities among the Dutch population (2010 to 2013) over gender, age, education, and income

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ABSTRACT

We investigate types of Internet activities among a representative sample of the Dutch population from 2010 to 2013. We examined usage patterns of seven types of Internet activities (i.e., information, news, personal development, commercial transaction, social interaction, leisure, and gaming) and related these patterns with gender, age, education, and income. Activities related to news, personal development, commercial transaction, and social interaction increased in popularity. For most capital enhancing activities, men, younger people, higher educated people, and people with higher than average incomes were prominent. These observations, however, are subject to change. The Internet seems to provide increasingly more capital-enhancing opportunities for those with higher education and income, which would accordingly reinforce their already strong positions in society.

1. Introduction

As of 2014, the diffusion of the Internet has reached a level as high as 84% in Germany, 87% in the United States, 91% in South Korea, up to 95% in the Scandinavian countries, and 96% in the Netherlands (ILS, 2014). In countries with such high diffusion rates, the Internet is becoming a basic requirement for social inclusion. Arguments about the Internet affecting social inclusion are reflected in the so-called 'digital divide' discourse. Digital divide-related research often takes one or more types of Internet access and investigates how these access points relate to socio-demographic variables. Access types that have gained attention include physical and material access, attitudinal access, skills access, and usage access (e.g., Blank and Groselj, 2014; Chen and Wellman, 2004; DiMaggio et al., 2004; Katz and Rice, 2002; Mossberger et al., 2003; Ono and Zavodny, 2007; Van Deursen and Van Dijk, 2011; Van Dijk, 2005). Usage access, or the type of Internet activities that users engage in, is especially interesting as it is the last stage of Internet appropriation or "the ultimate goal of trying to obtain access" (Van Dijk, 2005, p. 95). In countries with high rates of Internet connections (physical access), what people do online increasingly reflects traditional media in society and known economic, social, and cultural relationships that exist offline, including inequalities (e.g., Witte and Mannon, 2010; Zillien and Hargittai, 2009).

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In the current investigation, we apply a validated cluster of seven activity types (information, news, personal development, social interaction, leisure, commercial transaction, and gaming) among a representative sample of the Dutch population in the years 2010, 2011, 2012, and 2013. Cross-sectional data are repeated to consider patterns of change at the aggregate level. Most investigations lack detailed analyses about how activity patterns have developed over time, which is unfortunate because it is important to understand how Internet use has changed for evaluating the influence of policy initiatives, shifts in commercial markets and the evolving technology of Internet use (White and Selwyn, 2013). Furthermore, several observations make investigating how the type of activities people engage in online has changed over the past few years worthwhile. As in other developed countries, in the Netherlands the Internet landscape has changed. Searching for information has been one of the most popular uses of the Internet from the very beginning, even as new platforms and mobile devices continuously reshape the ways in which the Internet is used (Purcell, 2011). However, the ever-increasing popularity of social networks (e.g., Facebook and Twitter) drives all types of social interaction. In the Netherlands in 2013, 81% of the Dutch population over 16 report using a social network site (Van Deursen and Van Dijk, 2013). Furthermore, mobile Internet access on tablets and smartphones, which not only facilitate applications of social interaction, but also leisure and gaming activities is increasingly popular (Van Deursen and Van Dijk, 2013). Internet users increasingly obtain access through mobile devices and skip the traditional means of access through personal computer use (Napoli and Obar, 2013). Opportunities for personal development also increased in the Netherlands, hence the growing number of job searching engines and online educational possibilities (Van Deursen and Van Dijk, 2013). If we apply the normative judgment that some activities enhance capital more than others (e.g., information and personal development versus leisure and gaming), then repeated cross sectional data can reveal how central the Internet has become in everyday life. The first research question is as follows: *Did the type of online activities that people engaged in change between 2010 and 2013*?

The study's second contribution follows common digital divide research by focusing on gender, age, education level, and income differences, this time in relation to the observed activity patterns. Although several studies address the relationship between socio-demographics and type of Internet activity, little evidence exists about how this relationship has changed over time. For example, for popular entertainment activities, one might expect decreasing socio-demographic differences. However, this expectation may not be met for activities that require higher cognitive abilities or Internet skill capabilities (e.g., information searches or online educational opportunities). The current study sheds light on whether inequalities in online activities engaged in are widening or narrowing. Such investigations are necessary because scholars suggest that the type of activities people engage in has the potential to reproduce and even reinforce offline forms of inequality (DiMaggio et al., 2004; Hargittai, 2008; Van Dijk, 2005). The studied time period (2010–2013) is especially interesting because the economic crisis has created a growing class of low-income people in the Netherlands (OECD, 2013). These people are increasingly excluded from the mainstream economy and society at large. The second research question is as follows: *How do gender, age, education, and income relate to types of Internet activities and are these relationships changing*?

2. Theoretical background

2.1. Digital inequality

In early 2000, Compaine (2001) concluded that the rapidly decreasing cost of Internet access was narrowing the digital divide. Tambini (2000) also argued that decreasing costs and increasing user-friendliness of computing technologies were socially leveling. He believed that existing patterns of gender, class, and race inequalities had weakened. However, several traditional perspectives in defining social reproduction contest such predictions of egalitarian societies. For example, scholars who follow the ideas of Weber (1978) argue that 'technological repercussion and economic transformation threatens stratification by status and pushes the class situation into the foreground' (p. 938). According to Kuttan and Peters (2003), technological repercussions (e.g., Internet access) potentially affect equal social, educational, political, and economic opportunities. From collected data, they concluded that the digital divide has formed an 'information underclass'. The Internet functions as a commodity through which the distribution—at least initially—follows existing gender, class, and race divisions (Selwyn, 2006; Van Dijk, 2005; Willis and Tranter, 2006). Witte and Mannon (2010) argued that Internet access should be understood as an asset to maintain class privilege and power and that capitalist relations of production are maintained, as the inequalities upon which they rest are reproduced from one generation to the next. The intensive and extensive nature of Internet use among well-to-do and well-educated people suggests an exclusive lifestyle that is not accessible for those with less capital (Van Dijk, 2005; Witte and Mannon, 2010). By differentiating users' chances in life, use of the Internet can contribute to reproducing social inequalities (DiMaggio et al., 2004; Hargittai, 2008; Van Dijk, 2005).

Scholars who use Bourdieu's (1984) concept of social capital to explain different phenomena related to the reproduction of social inequality see social class broadly as a range of cultural, economic, and social resources that people access (e.g., Kvasny, 2006; Robinson, 2009). Resource access differences have the potential to reinforce each other when applied to the Internet (Van Dijk, 2005). There are three important requisites for Internet use: economic capital to acquire the supporting means (e.g., a personal computer and Internet subscription); social capital to learn how the Internet is used; and cultural capital to cope with the diverse amount of available content. When these requisites are met, the Internet can potentially increase economic capital (e.g., by buying profitable resources online), social capital (e.g., by extending physical networks to virtual ones, increasing the sense of community and civic engagement) (Katz and Rice, 2002), and cultural capital (e.g.,

by using the Internet to increase one's knowledge). When Internet access indeed reinforces existing social inequalities, the result might be a formation of excluded or disadvantaged individuals (Golding, 1996; Van Dijk, 2005). The Internet then structurally rewards and benefits a specific group of people that has access to information and services that are most relevant to them. For example, Mason and Hacker (2003) explained that society and its rules and resources are reproduced when members' actions reinforce the systems they have created or that existed prior to the use of a communication technology. They argued that there is a duality of structure inherent in this system, as the rules and resources affect and are the outcome of the interaction. Castells (2004) contended that because Internet access is essential to improve living conditions and personal development, it deepens discrimination and inequality in the absence of corrective policies. Van Dijk (2006) highlighted Tilly's (1999) concept of opportunity hoarding in relation to the Internet; those included exclude people on the opposite side of the boundary from using a value-producing resource such as the Internet, capture the returns and devote some of the returns to reproducing the boundary. Hargittai (2008) argued that differentiated uses of digital technology, which arise from existing social inequality, 'loop back and translate into differences in users' socioeconomic position' (p. 5).

2.2. Internet access

In the previous section it is argued that Internet access potentially contributes to reproducing social inequalities. Internet access, however, is a concept that needs more explanation. For example, over the last decade scholars have revealed that the digital divide goes beyond physical access, or the economic possibility of affording a high-speed Internet connection (e.g., DiMaggio et al., 2004; Van Dijk, 2005). Internet access should be considered as a complex set of issues that create and perpetuate differences between social classes (Goldfarb and Prince, 2008; Hilbert, 2011; Selwyn, 2004; Van Dijk, 2005). Proposed models for investigating digital divides generally include a sequence of Internet access indicators, spanning awareness, autonomy of use, attitudes, physical and material access, skills access, and usage access (e.g., Attewell, 2001; Chen and Wellman, 2004; DiMaggio et al., 2004; Katz and Rice, 2002; Livingstone and Helsper, 2007; Mossberger et al., 2003; Norris, 2001; Selwyn, 2006; Ono and Zavodny, 2007; Van Deursen and Van Dijk, 2011; Van Dijk, 2005; Van Dijk and Van Deursen, 2014; Warschauer, 2003). Van Dijk (2005) considers usage access as the final stage of appropriation. As a dependent factor, it is mostly defined in terms of frequency, the time spent on the Internet, or the type of online activities (Blank and Groselj, 2014; Van Deursen and Van Dijk, 2014). The latter is increasingly the focus of attention when investigating how people in different social groups use the Internet after obtaining physical access (e.g., Blank and Groselj, 2014; Hargittai and Hinnant, 2008; Livingstone and Helsper, 2007; Robinson, 2009; Van Deursen and Van Dijk, 2014). Recent investigations have provided valuable insights into differences in Internet activities and show that individuals in subordinate social classes in western countries tend to use the Internet in recreational and less capital-enhancing ways (Hargittai and Hinnant, 2008; Livingstone and Helsper, 2007; Pearce and Rice, 2013; Van Deursen and Van Dijk, 2014; Zillien and Hargittai, 2009). Capital-enhancing Internet activities (e.g., seeking financial information, learning about public issues, and gaining work assistance) increases opportunities in the offline world, while recreational Internet activities (e.g., browsing sites of personal interest, playing games, and socializing with strangers) is less likely to enhance capital (DiMaggio et al., 2004). Note that differences are not absolute, but as compared to each other. Investigating Internet activities becomes even more interesting when examining how differences have changed over time. When members with lower social status begin participating in capital-enhancing activities, usage inequalities might decrease. However, if higher-status members increasingly use such activities, usage inequalities are further strengthened.

2.3. A classification for Internet activities

Van Deursen and Van Dijk (2014) explained that properly observing the differences in Internet activities people engage in requires a classification based on important contemporary activities. However, the activity type needs to be defined on a conceptual level; it is important to move beyond the details of specific, individual activities (e.g., using email, watching videos, ordering groceries) to more abstract categories (Blank and Groselj, 2014). A relatively small, manageable set of internally consistent types of Internet activities is required. Van Deursen and Van Dijk (2014) have studied several candidates for such classification. Candidates included theoretical perspectives such as the uses-and-gratifications approach (Katz et al., 1974) or the expectancy-value model (Palmgreen and Rayburn, 1979), the technology acceptance model (Davis, 1989) or the model of media attendance (LaRose and Eastin, 2004), but also Internet user typologies (e.g., Brandtzæg, 2010). From these investigations, a cluster of seven Internet activity types—information, news, personal development, commercial transaction, social interaction, leisure, and gaming—was created and theoretically validated by the uses-and-gratifications theory. The classification, for example, proved useful in explaining why in the Netherlands lower educated people and disabled people spend more of their spare time using the Internet than do higher educated people and employed people (Van Deursen and Van Dijk, 2014).

2.4. Determinants of the type of activities people engage in online

Recent studies revealed several socio-demographic variables that explain individual differences in online activities. Findings consistently reveal differences across gender, age, education, and income classifications. For example, males are more likely to use the Internet for information, commerce, and entertainment, while females are more likely to use the Internet's communication tools (Jackson et al., 2001; Subrahmanyam et al., 2001; Valkenburg and Peter, 2007; Zillien and Hargittai,

2009). Young adults are the most prominent users of communication tools such as chat and instant messaging, entertainment, and leisure activities such as surfing for fun or downloading music (Dutton et al., 2011; Fox and Madden, 2005; Jones and Fox, 2009). In contrast, searching health information, buying products online, and emailing are relatively popular among older Internet users (Jones and Fox, 2009). DiMaggio et al. (2004) argued that the Internet is employed toward greater economic gain by people with higher socioeconomic status as compared to less privileged online persons. The latter employ the Internet in a more general and superficial manner. We consider socioeconomic status as a combination of education level and income. Education is an important predictor for the types of activities that people engage in online (Robinson et al., 2003; Van Deursen and Van Dijk, 2014). Studies in the US showed that higher educated people use the Internet for health information, financial transactions, research, news, work, travel, and product information, while lower educated people use the Internet relatively often for playing games, casual browsing, gambling, instant messaging or downloading music (Howard et al., 2001; Madden, 2003). Similarly, in the UK Helsper and Galacz (2009) concluded that people with lower education levels are least likely to go online with economic or educational purposes, even when levels of Internet access and skills are similar. Overall, higher educated people use the Internet relatively often for capital-enhancing activities (Hargittai and Hinnant, 2008). Although the income variable is strongly correlated with education level, several studies revealed an independent effect of income on material Internet access (e.g., Katz and Rice, 2002; Van Dijk, 2005). People with higher incomes are less likely to use instant messaging or to download music compared to people with lesser incomes (Madden, 2003). They do however use the Internet for work and are more likely to seek news and product information.

Prior investigations reveal that differences across gender, age, education, and income categories can be expected when investigating their relationships with different types of online activities. However, the most important contribution of the current investigation is an examination of how the relationship between the Internet activities and socioeconomic variables has changed over the past few years.

3. Method

3.1. Samples

This study administered online surveys that required approximately 12 min answering the questions. The study draws upon four samples collected in the Netherlands in September of 2010, 2011, 2012, and 2013. To obtain representative samples, we used PanelClix, a Dutch professional market research organization. By giving respondents a small monetary reward for every survey they complete, PanelClix was able to create a panel that consists of over 108,000 people which is representative for the Dutch population. The monetary reward depends on the length of the survey but is meant to increase motivation for participation. Each year, invitations were sent out to meet three quotas (i.e., gender, age, and education level) to ensure that the study's final sample fairly represented the Dutch population. In total, we obtained responses from 1418 individuals in 2010 (29% response rate), 1114 in 2011 (26% response rate), 1224 in 2012 (24% response rate), and 1125 individuals in 2013 (21% response rate). Because invitations were sent out to meet certain quotas and to ensure accurate population representation, analyses showed that the gender, age, and education of our respondents largely matched official statistics. See Table 1.

Because each successive survey collected a new random sample, each survey's respondents were different from those who responded in a prior and subsequent survey. All four samples can thus be assumed to be independent. We created a repeated cross-sectional dataset by combining data from the four surveys that were administered from 2010 to 2013. To the extent possible, we ensured that our variables and data were comparable. For all survey years, there were no differences in survey methodology, sampling strategy, question wording and design, or variable coding. All variables were measured and categorized in the same way each year. Furthermore, for each of the four datasets, we used the same external aggregate data

Table 1
Demographic profiles for 2010 (N = 1418), 2011 (N = 1114), 2012 (N = 1224), and 2013 (N = 1125).

	2010		2011		2012		2013		Census*
	N	%	*N*	%	*N*	%	*N*	%	%
Gender									
Male	729	51	556	50	623	51	575	51	52
Female	689	49	558	50	601	49	550	49	48
Age									
16–35	290	21	245	22	273	22	287	26	22
36–50	358	25	313	28	346	28	312	28	28
51–65	528	37	360	32	390	32	318	28	27
66+	242	17	195	18	215	18	208	19	23
Education									
Low	402	28	329	30	361	30	337	30	36
Middle	508	36	443	40	523	43	510	45	40
High	508	36	342	31	340	28	278	25	24

* Derived from CBS Statistics Netherlands, 2013.

(i.e., the national population census) to estimate weights. As can be observed in Table 1, not all quotas are similar, which is required to compare usage in subsequent years. Therefore, we derived calibration weights by defining groups based on age, gender, and education. Post-stratification adjustment was applied in the main analysis (i.e., weights were scaled each year to have a mean of 1) with each individual being weighted equally (at 1). This weighting procedure ensured that no artifactual jumps were created between the surveys. Because the data were cross-sectional, the intention of the adjustment was to create the best population estimates from the information available at the time, and temporal consistency was not considered.

3.2. Measures

The questionnaires gathered information related to the respondents' demographics and Internet usage. Internet usage types were measured using an 18-item inventory for information, news, personal development, commercial transaction, social interaction, leisure, and gaming. Authors (2014) validated this classification of Internet usage activities with motivational categories that were proposed in uses-and-gratifications theory as mode of comparison. In the instrument, we asked respondents to specify to what extent they used the Internet for several activities. Respondents were asked how frequently they perform these activities using an ordinal-level measure with a five-point scale (with a range from 'never' to 'daily'). Table 2 lists the descriptive statistics for each item. Scale scores exhibited moderate to high internal consistency (measured by Cronbach's alpha).

We included gender as a dichotomous variable. For age, respondents had to indicate their birth year which was later transposed to a continuous variable. Data concerning education were collected by degree and afterwards divided into three groups representing low, medium, and high education levels. Finally, we asked for the total family income in the last 12 months. Categories ranged from 10,000 Euros to 80,000 Euros and above.

3.3. Data analyses

In the first step of the analyses, means and standard deviations for all seven usage clusters from 2010 to 2013 were counted to conduct Bonferroni post-hoc ANOVA tests and to determine whether and how usage of all clusters had changed. To identify Internet usage predictors, multiple linear regression analyses were performed for each usage category with gender, age, and education as independent variables. The survey year was added to the models to examine usage changes over time. To further examine whether changes in Internet usage were different between gender, age, and education, interaction terms were added to each of the seven models. To avoid multicollinearity between the predictors and the interaction terms,

Table 2
Descriptives and reliabilities of usage clusters; 2010–2013 (scale ranging from 1-never to 5-daily).

	2010		2011		2012		2013	
	M	SD	M	SD	M	SD	M	SD
Personal development (α = .78)	1.61	0.69	1.63	0.68	1.71	0.86	1.75	0.89
Finding online courses and training	1.84	0.97	1.85	0.96	1.84	1.01	1.86	1.03
Following online courses	1.28	0.68	1.28	0.68	1.42	0.88	1.49	0.96
Find vacancies/applying for jobs	1.59	0.98	1.62	1.00	1.80	1.13	1.83	1.17
Independent learning	1.73	1.15	1.76	1.16	1.80	1.20	1.83	1.18
Leisure (α = .64)	2.76	1.03	1.78	1.03	2.66	0.97	2.71	0.97
Downloading music/video	2.21	1.28	2.24	1.30	2.13	1.26	2.20	1.30
Hobby	2.51	1.22	2.52	1.23	2.31	1.17	2.42	1.19
Free surfing	3.57	1.54	3.59	1.53	3.53	1.48	3.50	1.46
Commercial transaction (α = .71)	2.77	0.85	2.77	0.86	2.90	0.83	2.95	0.83
Using sites such as eBay	2.86	1.17	2.86	1.17	2.98	1.17	3.02	1.13
Acquiring product information	2.89	1.06	2.87	1.06	2.83	1.00	2.91	1.00
Shopping or ordering products	2.57	0.98	2.57	1.00	2.87	0.99	2.88	0.96
Social interaction (α = .62)	2.42	1.12	2.45	1.11	2.66	1.09	2.75	1.11
Using social network sites	2.93	1.66	2.98	1.66	3.50	1.65	3.74	1.60
Chatting	2.24	1.52	2.26	1.54	2.43	1.51	2.43	1.53
Sharing photos/videos	2.10	1.14	2.12	1.16	2.04	1.21	2.09	1.26
Information (α = .81)	4.35	0.74	4.36	0.74	4.35	0.73	4.34	0.71
Using search systems	4.52	0.82	4.52	0.82	4.51	0.84	4.52	0.79
Searching information	4.18	0.88	4.20	0.87	4.19	0.88	4.16	0.89
News (α = .72)	3.45	1.34	3.45	1.35	3.65	1.27	3.64	1.27
News services	3.55	1.53	3.55	1.52	3.75	1.42	3.72	1.42
Newspapers and online magazines	3.35	1.53	3.35	1.53	3.56	1.44	3.56	1.43
Gaming	2.27	1.52	2.29	1.53	2.30	1.54	2.40	1.59
Playing online games	2.27	1.52	2.29	1.53	2.30	1.54	2.40	1.59

the predictor variables were centered (i.e., put in deviation form by subtracting means from the observed scores), and the centered predictors of interest were multiplied to form interaction terms.

4. Results

4.1. Changing nature of Internet activities people engaged in

Table 3 displays the means and standard deviations for the seven activity clusters from 2010 to 2013. Post-hoc tests revealed significant changes for five clusters: personal development, leisure, commercial transaction, social interaction, and news. For these clusters, with the exception of leisure, usage increased over the four years studied, with the most notable change after 2011. While Internet usage for information purposes remained constant and was still the most popular activity in 2013, activities related to social interaction increased the most. The popularity of using social networking sites is the main cause (see Table 2). Although the figures concerning online gaming reveal a growing tendency, the results are not significant.

4.2. Determinants of Internet usage

Table 4 shows the results of the regression analyses for each Internet usage type. For all activity types (except information), changes over time are noticeable. In most cases, gender, age, educational level, and income are significant predictors. Furthermore, the table reveals that several of the changes over time differ for gender, age, education, and income subgroups (significant interaction terms). For each activity, the results are discussed below.

4.2.1. Information

Using the Internet for informational purposes is more popular among men than among women. Furthermore, age negatively affects such activities, meaning that younger respondents use the Internet more than older respondents for information purposes. Education and income show positive effects. A significant interaction effect of education (see Fig. 1) reveals that the gap between respondents with medium and high education levels increased between 2010 and 2013. However, respondents with lower education levels in 2013 share similar usage levels with those with medium education levels. Finally, income positively affects activities related to information purposes.

Table 3
Post-hoc tests (Bonferroni with 5% significant level) for usage categories; M(SD) for 2010–2013.

	2010	2011	2012	2013
Information	4.35(0.74)^{a}	4.36(0.74)^{a}	4.35(0.73)^{a}	4.34(0.71)^{a}
News	3.45(1.34)^{a}	3.45(1.35)^{a}	3.65(1.27)^{b}	3.64(1.27)^{b}
Commercial transaction	2.77(0.85)^{a}	2.77(0.86)^{a}	2.90(0.83)^{b}	2.94(0.83)^{b}
Leisure	2.76(1.03)^{a}	2.78(1.03)^{a}	2.66(0.97)^{b}	2.71(0.97)^{a,b}
Social interaction	2.42(1.12)^{a}	2.45(1.11)^{a}	2.66(1.09)^{b}	2.75(1.11)^{b}
Gaming	2.27(1.52)^{a}	2.29(1.53)^{a}	2.30(1.54)^{a}	2.40(1.59)^{a}
Personal development	1.61(0.69)^{a}	1.63(0.68)^{a}	1.71(0.86)^{b}	1.75(0.89)^{b}

Note: For 2010–2013, within each row, means with non-common superscripts are significantly different.

Table 4
Multiple linear regression analyses for the seven usage clusters; standardized beta's (β).

	Information	News	Commercial transaction	Leisure	Social interaction	Gaming	Personal development
Gender (M/F)	−.07***	−.10***	−.10***	−.24***	−.02	.06***	−.10***
Age	−.18***	−.04*	−.20***	−.40***	−.43***	−.17***	−.40***
Education	.06***	.04*	−.04*	−.01	−.07***	−.08***	.07***
Income	.12***	.15***	.14***	.07***	−.04*	−.08***	−.03
Year	.00	.08***	.06***	−.04**	.10***	.01	.10***
Gender* year	.03	.03	.03	.02	−.01	−.05**	−.01
Age* year	.02	.05***	.03*	.04**	.05**	−.03	−.05**
Education* year	−.05**	−.06**	.02	.02	.04*	.02	−.03*
Income* year	.03	.03	−.02	.02	.00	.01	.04*
F	33.43***	28.06***	35.93***	125.80***	100.39***	21.01***	94.73***
Adj. R^2	.08	.06	.08	.24	.20	.05	.19

Note:
* $p < .05$.
** $p < .01$.
*** $p < .001$.

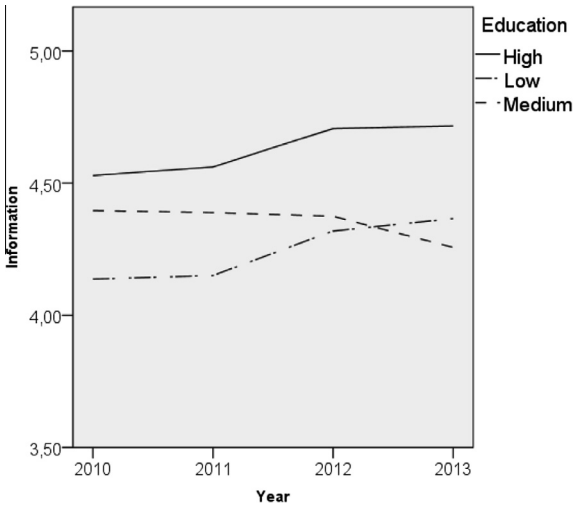

Fig. 1. Interaction of education for information.

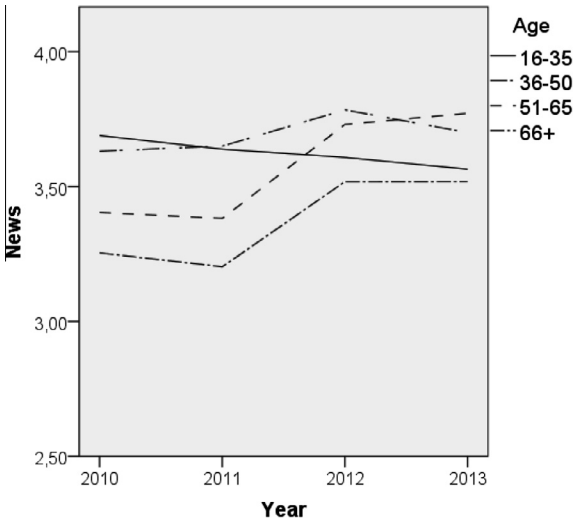

Fig. 2. Interaction of age for news.

4.2.2. News

We find that men use the Internet more than women for new-related information. News-related activities are popular among all ages, although the relationships with different age groups changed between 2010 and 2013. Fig. 2, for example, reveals that news-related activities are almost as popular among those aged between 16 and 35 and those over 65 in 2013. In the group aged 16 to 35, a small decrease can be observed. The higher their education levels, the more often respondents use the Internet for news-related activities. Fig. 3 shows that differences in news-related activities have increased between respondents with high and medium education levels from 2010 to 2013. Finally, income positively affects news-related activities.

4.2.3. Commercial transaction

Activities related to online commercial transactions are more popular among males than females. Age negatively affects these activities, meaning that younger respondents use the Internet more for commercial purposes. However, Fig. 4 reveals that the oldest age group is increasingly participating in this activity type. Education shows a small but significant negative effect, meaning respondents with lower education levels are more likely to use the Internet for commercial purposes. Finally, the higher their incomes, the more likely respondents are to use the Internet for commercial purposes.

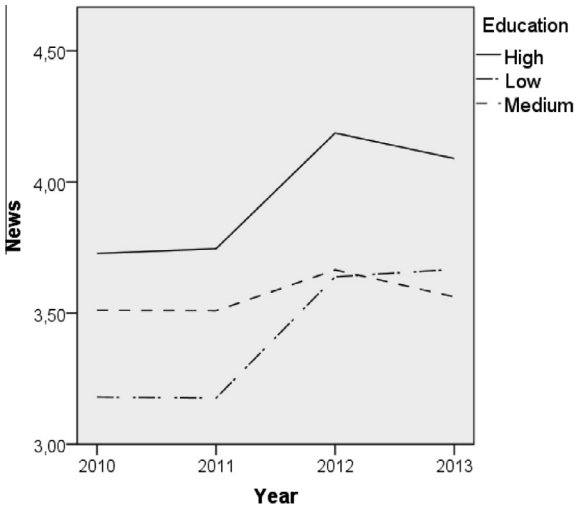

Fig. 3. Interaction of education for news.

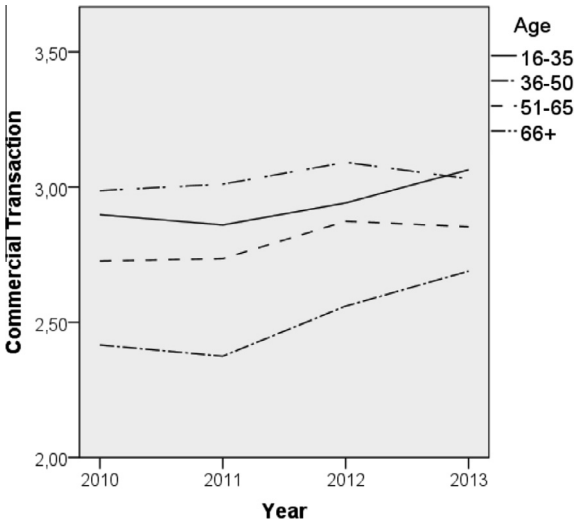

Fig. 4. Interaction of age for commercial transaction.

4.2.4. Leisure

Leisure-related activities decreased slightly between 2010 and 2013. Online leisure activities are more popular among males than females. Age negatively affects this usage, meaning that younger respondents still use the Internet more for leisure. However, as shown in Fig. 5, the use of online leisure activities decreased across all age groups, except in the group of older adults. Finally, income positively affects this type of usage.

4.2.5. Social interaction

Of all activity types, social interaction revealed the strongest increase between 2010 and 2013. This increase mainly resulted from the popularity of social network sites (see Table 2). No gender differences surfaced. Age negatively affects this usage, meaning that younger respondents still use the Internet more for social interaction. However, as shown in Fig. 6, the increase in social interaction over the past four years is strongest in the three oldest age groups. Education and income negatively affect this usage. Notably, Fig. 7 reveals that respondents with higher education levels overtook those with lower education levels in 2013.

4.2.6. Gaming

Online gaming has been more popular among women than among men. However, as shown in Fig. 8, the difference almost disappeared in 2013. Gaming is more popular among younger people, given the negative effect of age. In terms of

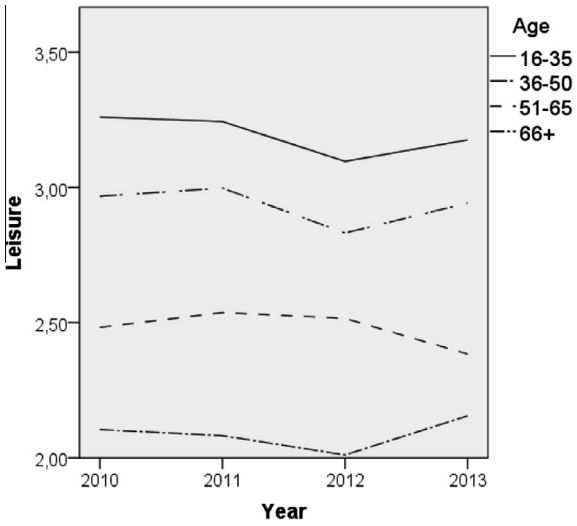

Fig. 5. Interaction of age for leisure.

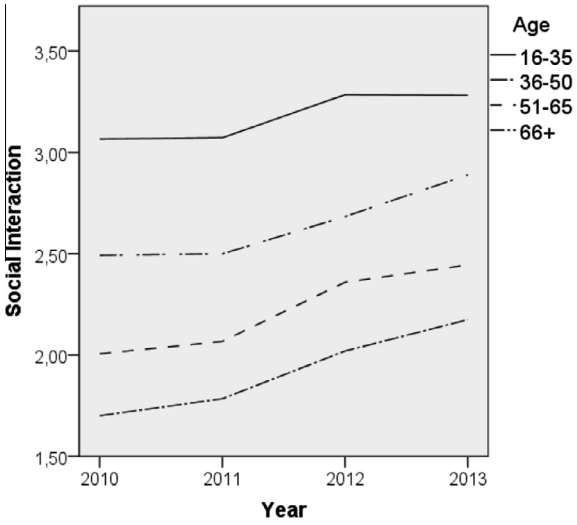

Fig. 6. Interaction of age for social interaction.

education and income, we see that people with lower education levels or those with lower incomes generally use the Internet more for gaming than their counterparts with higher education levels and higher incomes.

4.2.7. Personal development

More males than females participate in activities related to personal development. Furthermore, age negatively affects this usage. However, Fig. 9 reveals that Internet use for personal development especially increased among individuals in the youngest age group. Above the age of 51, using the Internet for personal development remained more or less consistent. Education appeared as a positive contributor. Fig. 10 reveals that engagement in activities related to personal development increased faster among the most highly educated group. While differences between respondents with lower and medium education levels decreased, differences between high and medium and high and lower education levels increased. Finally, there is a significant interaction effect for income (see Fig. 11). Differences between respondents with higher incomes, on the one hand, and average or below average incomes, on the other, increased.

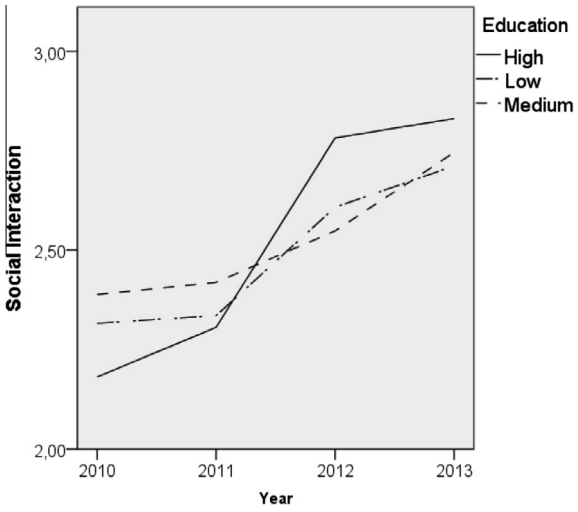

Fig. 7. Interaction of education for social interaction.

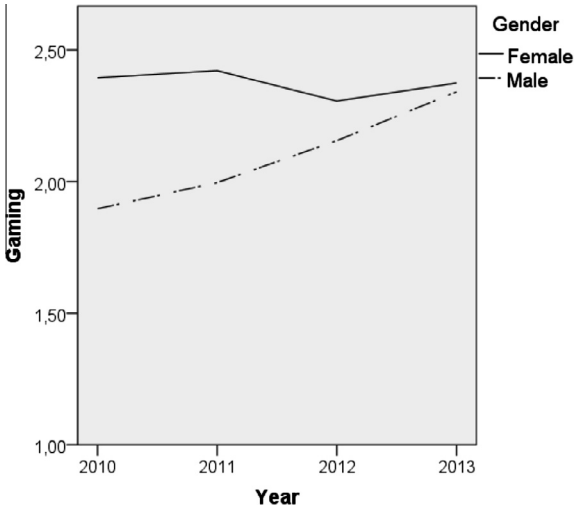

Fig. 8. Interaction of gender for gaming.

5. Discussion

5.1. Main findings

Although it is not clear how exactly offline and online inequality are intertwined (Helsper, 2012), several scholars argue that Internet access has the potential to reproduce and even reinforce offline forms of social inequality. Such arguments stress the importance of studying how Internet access is changing. When focusing on inequalities in Internet access, most relevant are the different activities in which people choose to engage. With respect to the first research question – *Did the type of online activities that people engaged in change between 2010 and 2013*? – some interesting patterns among seven activity types surfaced. Activities related to personal development, commercial transaction, social interaction, and news increased in popularity. In a country where the population's physical broadband connection rates were almost saturated in 2013, the Internet has become central in everyday life. Activities related to social interaction increased the most, which is not surprising given the popularity of social networking sites. However, Internet usage for information purposes remains the most dominant activity, as it has been since the early days of Internet usage in almost all countries (Purcell, 2011). Although the emergence of new platforms and mobile devices continuously reshapes Internet usage, these changes do not corrupt the Internet's original purpose, as once someone makes information available, it should be accessible to anyone, with any type of computer, in any country (Berners-Lee & Fischetti, 2000).

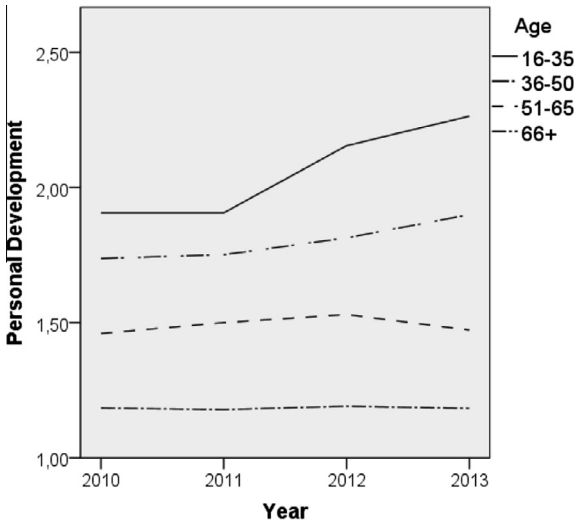

Fig. 9. Interaction of age for personal development.

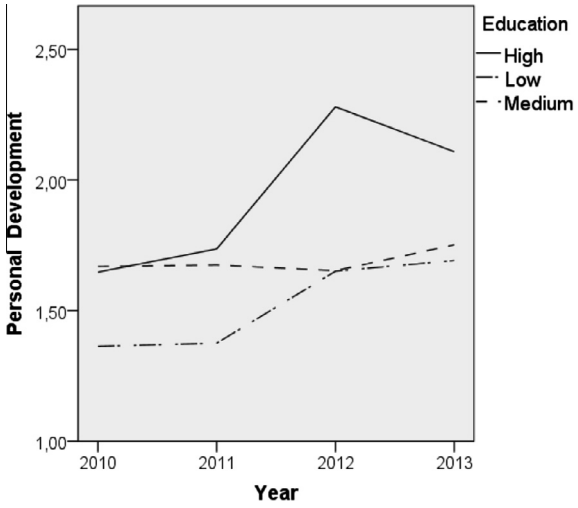

Fig. 10. Interaction of education for personal development.

Recent studies suggest that how the Internet is used increasingly reflects the use of traditional media and known offline economic, social, and cultural relationships, including inequalities (e.g., Witte and Mannon, 2010; Zillien and Hargittai, 2009). With respect to the second research question – *How do gender, age, education, and income relate to types of Internet activities and are these relationships changing*? – in terms of inequalities, gender, age, education, and income appeared as salient predictors for differences in the activities engaged in online, as expected in the recent body of literature (e.g., Goldfarb and Prince, 2008; Katz and Rice, 2002; Livingstone and Helsper, 2007; Pearce and Rice, 2013; Robinson et al., 2003; Ono and Zavodny, 2007; Van Deursen and Van Dijk, 2014; Zillien and Hargittai, 2009). For most capital-enhancing activities, men, younger people, higher educated people, and people with higher than average incomes take the lead. Activities related to social interaction and gaming are overall more popular among people with lower education levels and among those with below average incomes. These observations, however, are subject to change. When comparing differences in activities between subgroups in the studied time period (2010–2013), some important observations can be made. The results suggest that differences in most activity clusters are largely maintained. For some activities, an increase between socio-demographic subgroups can be observed. Personal development is the most important activity type in terms of capital enhancing Internet activities. Although capital-enhancing activities related to information and personal development would be beneficial to those of lower socioeconomic status (even more so because they struggled most in the economic climate between the years 2010 and 2013), those higher up on the ladder profit increasingly more. The results suggest that the Internet seems to provide increasingly more capital-enhancing opportunities for those of higher socioeconomic status, which potentially rein-

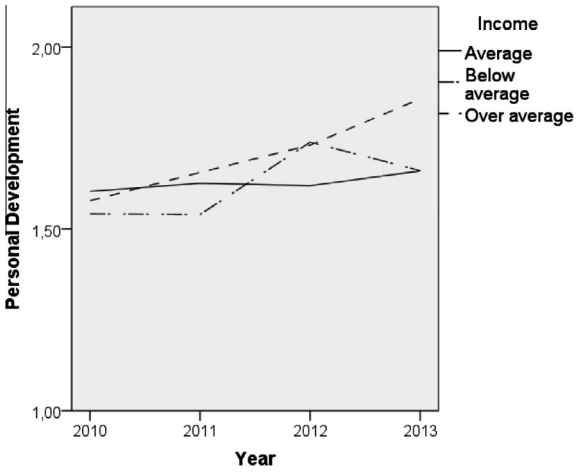

Fig. 11. Interaction of income for personal development.

forces their already-strong positions in society (Helsper, 2012; Van Dijk, 2005; Witte and Mannon, 2010). Surprisingly, we also found that differences between the lower and middle educated subgroups seem to be diminishing. There might be two explanations for this observation. First, capital enhancing activities are primarily interesting for people with the highest level of education. Second, this result corresponds with the decline of the middle class (Pressman, 2007), which is observed in several countries. In any ways, the results suggest that inequalities in the activities engaged in online are at least long-lasting because they are engrained in the fabric of our information society.

The consistent or increasing differences between educational and income subgroups suggest a more permanent structure of socioeconomic inequality, as compared to social inequalities in terms of age and gender that might be temporary and partly decreasing. Although several age-related differences are observed in terms of online activities, some of these differences reveal a diminishing pattern. Current older generations increasingly start to use Internet activities such as social interaction and gaming. Furthermore, contemporary youth will grow old. Therefore, to a certain degree, age differences can be considered a temporary phenomenon. However, the results also show that age differences in capital-enhancing activities related to personal development are increasing. This increase might be related to the economic climate in the studied time period (2010–2013), which forced younger people to obtain additional qualifications, while those over the age of 55 were less desired and therefore put in a more hopeless position in terms of potential labor opportunities.

The observed gender differences seem consistent over time, except for gaming, which in 2013 is as popular among males and females. This consistency suggests that a particular share of inequality will remain based on relatively permanent sociocultural preferences.

In economic, political, social, cultural, and health domains, online information and services are increasingly offered. Many expect that the majority of the population will eventually use these online resources. The results suggest that parts of the population will increasingly use capital-enhancing Internet activities relatively less often. Therefore, policy directions should be evaluated within several domains. However, a dark picture of structural differences in online engagement can be partially remediated. The main causes for Internet users to choose activity types are motivations and positions in society. Government interventions should attempt to reduce the level of usage inequality, for example, by making Internet activities related to information and personal development more attractive for larger populational segments. Finally, improving and expanding positions in the labor market and education (having an appealing job and attending (adult) education) might positively contribute to reducing differences in the activities people engage in online.

5.2. Limitations

The current study uses longitudinal cross-sectional panel data to demonstrate aggregate level changes in populations and subgroups between 2010 and 2013. This timeframe was partly chosen out of convenience (data from other years are not yet available). To observe the longitudinal trends of growing structural inequalities hypothesized in this contribution, ideally data of more years is needed. However, developments in this timeframe (e.g., the increasing popularity of social media and mobile technologies) in combination with a difficult economic climate make the timeframe very interesting. Future studies should continue to focus on persisting patterns in online activities observed in these four years. Such analyses provide a better understanding about whether online inequalities are structural and in which direction they are developing.

This analysis fits within and provides additional information to current debates about growing social inequalities. However, it must be stressed that the relationship between offline and online inequality is not conceptually clear (Helsper, 2012). Several scholars provide elaborate arguments about Internet usage reproducing and even reinforcing social inequality, but future studies need to be conducted for empirical support. In terms of the assumed advantages of capital-enhancing Internet

activities, they actually create more benefits for different types of resources and capital when compared with less capital-enhancing activities. In the current investigation, we have only shown evidence of unequal participation in online activities, which has changed over time.

In the current investigation, we classified seven Internet activity clusters. Future studies could further improve the identified activity clusters. The gaming cluster, for example, contained one item. Additional items can be extracted from recent work of Blank and Groselj (2014), who compared studies that have focused on identifying Internet activity clusters.

The focus of digital divide studies increasingly is on attitudes, skills, or activity type. As in the current study, the latter is often considered the ultimate goal of obtaining Internet access. However, the most interesting question in digital divide discourse is who actually benefits from being online. Unfortunately, theoretical clarity about the tangible outcomes of engaging in online activities is scarce, and gauging outcomes is most likely the most complex aspect of analyzing Internet access. There is no clear understanding of how differences in skills or usage translate into actual outcome variations. Future studies might attempt to focus on the direct implications of Internet use to reveal how Internet activities affect opportunities.

The repeated cross-sectional data we used demonstrates aggregate level change for several subgroups. However, we were unable to discern patterns of individual change. Future studies might attempt to undertake the latter, which requires a repeated measurement for the same respondents.

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