

SECOND-LEVEL DIGITAL DIVIDE

How Internet Use Patterns Depend on Education and Gender

Term Paper



TECHNISCHE
UNIVERSITÄT
DARMSTADT

Author:	Jochen Röth
Student Number:	NA
Mail:	NA
Address:	NA
	NA
University:	TU Darmstadt
Area of Studie:	Institute of Sociology
Department:	Department 02
Semester:	Summer Semester 2015
Seminar:	Advanced Statistical Methods in SPSS
Professor:	Rizwana Yousaf



Abstract

This paper explores the phenomenon of the second-level digital divide and how it correlates with education and gender in Germany. The second-level digital divide refers to how different people use information and communication technology (ICT), especially the Internet. In this paper I argue that the ubiquitous character of ICT misleads often to common sense terms like information and knowledge society or digital native and digital immigrant, which neglecting the different use patterns of ICT. The study was conducted with a data set of ALLBUS 2004 from GESIS as a secondary analysis. To analyse the concept of the second-level digital divide I separate the use patterns in two categories - professional use of ICT and the use of ICT as entertainment medium. The study shows that people with a higher education level use the Internet in a more sophisticated way than people with a lower education level. While the gender gap seems slowly closing up, education is highly significant for a more sophisticated use of the Internet. Moreover, on one hand people with greater Socioeconomic and cognitive resources use ICT more frequently for information. On the other hand there is no significant difference in use of the Internet as entertainment medium from their less educated counterparts. This paper contributes to the debates on examine the different use patterns and discuss their implications. Furthermore, it shows the limitations of this research and try to develop further research questions.

Keywords: Second-level digital divide, gender, education, information and communication technology, ICT, Germany

Contents

1	Introduction	1
2	Materials and Methods	8
3	Results	11
4	Discussion	14
5	Notes	17
	References	18



1 Introduction

The ubiquitous nature of information and communication technology (ICT) is no longer contestable in the 21st century. ICT surrounds us everywhere in everyday life. The transformation from industrial society to information and knowledge society seems certain. This is accompanied with the enthusiastic view that the Internet would reduce inequality by lowering the cost of information and thus enhancing the ability of low-income men and women to gain human capital, find and compete for good jobs, and otherwise enhance their life chances. A more critical view suggests that the greatest benefits accrue to high socioeconomic status persons, who may use their resources to employ the Internet sooner and more productively than their less privileged peers. Socioeconomic status thus acts as a multiplier effect.¹

Beyond this, The designations digital native or net generation on one hand and digital immigrant on the other hand, establish themselves in theories and debates. The former is the generation born roughly between 1980 and 1994. It is claimed, these young people's use of ICT differentiates them from previous generations. These differences are so significant that the nature of education itself must fundamentally change to accommodate the skills and interests of these young people. The terms of the digital natives and net generation include the assumption, that these young generation learn differently compared with the past generation. Further this young net generation possesses sophisticated knowledge of and skills with ICT. Notwithstanding, as Bennett argues, are those statements restricted by the lack of empirical evidence and supported by anecdotes and appeals to common-sense beliefs. This issue is more complex than that it only covers the period of birth. She further points out that, while ICT is embedded in their lives, young people's use and skills are not uniform. On one hand the both terms mentioned above neglecting the point of different use of ICT for the group of the digital natives and net generation.² On the other hand a research by Loges and Jung supports the idea of the differences concerning the Internet connectedness and age. Their study demonstrates that the differences between old and young people extend beyond questions of pure access. Older people differ

¹DIMAGGIO, PAUL; HARGITAI, Eszter; Neuman W. Russel; Robinson John P.: Social Implications of the Internet. Annual Review of Sociology, 27 2001, Nr. 1; BADILLO, PATRICK-YVES; BOURGEOIS, Dominique: Information and Knowledge Society and Network Economy: from Euphoria to reality. Economics For The Future.

²BENNETT, SUE; MATON, Karl; Kervin Lisa: The 'digital natives' debate: A critical review of the evidence. British Journal of Educational Technology, 39 2008, Nr. 5.

*1 Introduction*

from their younger ones in the nature and context of their Internet use. Older people report lower overall Internet connectedness. These differences arise from the circumstances that older people pursuing a narrower scope of goals and online-activities, using fewer applications, and using the Internet in fewer places than younger people. Those differences even remain after controlling the substantial inequalities of access by ethnicity. But they also remember to consider that older people may have lower Internet connectedness because they don't want higher Internet connectedness. If so, age per se is not the relevant variable. Their research can not answer this question clearly.³

In parallel, a critical debate established about a new form of social inequalities - the digital divide. DiMaggio describes this as follows: Digital divide refers to inequalities in access to the Internet, extent of use, knowledge of search strategies, quality of technical connections and social support, ability to evaluate the quality of information, and diversity of uses. Further research shows, that the comparison of online-behavior of experienced and novice web users reinforces the notion, that the effect of Internet use may vary with user competence. The less experienced users engage with more aimless surfing, were less successful in finding information and were more likely to report feeling a negative effect by doing such things mentioned above.⁴ Hargittai describes digital divide similarly:

"The gap between those who have access to digital technologies and those who do not, or the gap between those who use digital technologies and those who do not, understood in binary terms distinguishing the 'haves' and 'have nots'."⁵

In this context, she define digital inequality as follows:

"A refined understanding of the 'digital divide' that emphasizes a spectrum of inequality across segments of the population depending on differences along several dimensions of technology access and use."⁶

Hargittai illustrates this with her further research. For instance, members of the general user population lack the basics of surfing the web. Therefore, Searching information or entering valid search terms in a search engine will be incredible hard and time expensive. Some of them barely know what does a "back button" in a

³LOGES, Joo-young: Exploring the Digital Divide: Internet Connectedness and Age. Communication Research, 28 August 2001, Nr. 4.

⁴DiMAGGIO: Annual Review of Sociology 27 [2001].

⁵HARGITTAI, Eszter: The Digital Divide and What To Do About It. New Economy Handbook, 2003.

⁶Ebd.



1 Introduction

browser do.⁷ In addition she shows that young people (late teens and twenties) have a much easier time to getting around online than their older counterparts (whether people in their 30s or 60s). Those findings by Hargittai supports the assumptions of Bennett and her thesis about the digital native and digital immigrants.

So, she makes a distinction between two levels. The first-level deals with the access to ICT and the Internet. Insights on the first-level digital divide offer Korupp and Szydlík. Their general research questions is who uses ICT for his or her private purpose. Their research reveals differences in use of ICT. The influence of high status position and high education on the individual level and primary social relations within the family context determine in large parts, who use computers and ICT and who does not.⁸

The second-level deals with the use of ICT and the Internet. The second level describes the ability to use the Internet effectively and efficiently⁹

In addition to Hargittai, van Dijk and Hacker describe a complex view of the digital divide. In their research they show that the digital divide is a complex and a dynamic phenomenon. So, this goes beyond a static approach. In the information and knowledge society, the inequalities between the various levels begin to move. Today the growth rates of ICT are enormous, almost everybody owns ICT. In the early nineties very few people had computers at home, for instance. The reason for the complexity of the digital divide is that there are in fact several digital divides. While some digital gaps, like the material, are closing others are widening. Technology is advancing, spreading into society and revealing new social differences. Since the nineties the gender gap in possession of ICT has started to close. Nevertheless, the gender gap in skill and usage remain or mature. Moreover, large differences in digital skills and usage have been observed recently. Those gaps may grow in the future, but this cannot be proven in cause of lack of time-series data. In a wider range they argue to consider more details like material, social and cognitive resources which influence the digital divide. Possession of digital equipment depends on the material circumstances like income, education, etc.. So higher socioeconomic status tend to acquire ICT at a faster rate than the lower status segments. Social includes a social network which possessing and using ICT as well. Furthermore, the possibility to get support of your social network to manage your ICT. The last point of cognitive resources include literacy, numeracy and informancy. Literacy means the ability of reading and searching for information in texts. Numeracy is the skill to handle numbers, figures, tables

⁷HARGITTAI, Eszter: Second-Level Digital Divide: Differences in People's Online Skills. First Monday 7 2002, Nr. 4.

⁸KORUPP, SYLVIA E; SZYDLÍK, Marc: Causes and Trends of the Digital Divide. European Sociological Review, 21 September 2005, Nr. 4.

⁹HARGITTAI: New Economy Handbook 2003.



and to compute. Informancy are the digital skills of operating digital equipment and searching for information in digital resources. Skill and use of ICT depend on all of them.¹⁰

A more comprehensive and structured perspective on how to measure the topic of digital divide and digital inequality shows Barzilai-Nahon. She claimed that technology is not a neutral artifact in society. And therefore, technology should be comprehended and explicated within a given context. Technology is part of daily politics and social life as well, and as such it should be approached as a social and behavioral phenomenon. She suggest the following approach separated in three dimensions. The first dimension is the purpose of the tool, which includes the question what and how to measure to analyse and conceptualize the digital divide. On one hand single factors such "access" are easy and convenient to measure, but less sophisticated, for instance. On the other hand it is meaningless to ask for factors of usage in a country where connectivity is almost zero or to ask about affordability of infrastructure in countries that give it for free, for instance. Even there exist some ready to use tools to measure the digital divide Tools and techniques should be different for countries. The concept of digital divide has to be measured differently for Germany, USA or Scandinavia, for instance. The next level, the level of observation, is about at which level the digital divide should be measured. The discrepancies at local, national or international levels cannot be disregarded. The last level, which framework or method to choose for approaching the data, is important as well. Collecting data with a ready to use questionnaire, case studies or third party surveys play a crucial role in the analysis process. She stated there are many definitions of the digital divide and suggest the following comprehensive metric.¹¹

1. Infrastructure access

- Communication channels and capacity
- Computers per capita
- Websites per capita
- Number of Internet Service Providers (ISP) per capita
- ISPs: governmental incumbent or private

2. Affordability (relative to other expenditures and average income)

- Physical layer (infrastructure)

¹⁰DIJK, JAN; HACKER, Kenneth van: The digital divide as a complex and dynamic phenomenon. The Information Society, 19 September 2003, Nr. 4.

¹¹BARZILAI-NAHON, Karine: Gaps and Bits: Conceptualizing Measurements for Digital Divide/s. Inf. Soc. 22 2006, Nr. 5.



1 Introduction

- Logical layer (application and software)
- Content

3. Use

- Frequency
- Time online
- Purpose
- Users skills
- Autonomy of use

4. Social and governmental constraints/support

- Training
- Active help
- Support/ suppression/ apathy
- Investment and funding
- Autonomy of use

5. Sociodemographic factors

- Socioeconomic status
- Gender
- Age
- Education
- Geographic Dispersion
- Ethnic diversity
- Race diversity
- Religiosity
- Language

6. Accessibility (disabled and special needs people)



1 Introduction

Another question which arises deals with the gap between men and women. Kennedy et al. points out that doing gender is something that people do continually. It's a structuring category of social life which affects almost everything that people do. This includes certainly accessing and using the Internet. That's why they postulate that this means that long as gender has any social meaning, the Internet will be gendered. They move beyond the simple issue of Internet access and the binary logic of "have" and "have not". Their findings show that women have less opportunity to go online in the home because of these domestic responsibilities, and in practice are online less often than men. The historical women's role of care giving has an impact over and above gender itself. Care about the families at home goes hand in hand with less and different use of the Internet. Furthermore, women and men use the Internet differently and in different amounts in cause of social expectations guided by gender roles. Women Internet use is more social than men's use of the Internet. The study reveals that women use the Internet especially for email and communication, and less than men for information retrieval and recreation use. Finally they stated that gender, age, class, race and sexuality are all fundamental components that often affect daily activities and experiences - this includes the virtual world as well.¹² The gap between men and women in access to the Internet reflected male and female differences in income and other resources. Nevertheless, women with access to the Internet use it less frequently than men with the same socioeconomic status do.¹³

Until here we have seen there are different and balanced views of the topic of digital divide and digital inequality. At first there is a new technology, in this case ICT, which led the researchers to form new theories and concepts about society. Furthermore, there is a formation of Buzzwords, like digital native and digital immigrants, which move into general usage and common sense with a more or less scientific background. In addition, there are also differences in the measurement of the new concepts and theories, from a small to complex spectrum. From a one dimensional perspective to a deep analysis which considers the social and cognitive background over time.

While the first-level was investigated by Korupp and Szydlik the starting point of this paper is the second-level divide. As they indicate in their research paper the underlying survey of GSOEP does not contain measures on user patterns either.¹⁴ The ALLBUS 2004 provide this kind of data set. Therefore, I examine whether different ICT usage patterns depend on educational qualifications and gender in Germany. After all, the research question can be formulated as follows: Is there any significant correlation between education and gender and the Internet use patterns of individuals? Therefore, my main research hypothesis (H0) is as follows: There is a

¹²KENNEDY, TRACEY;WELLMAN, Barry;Klement Kristine: Gendering the digital divide. IT Society, 1 summer 2003, Nr. 5.

¹³DiMAGGIO: Annual Review of Sociology 27 [2001].

¹⁴KORUPP: European Sociological Review 21 [2005].



1 Introduction

correlation between Internet use patterns and education and gender. This hypothesis can be divided into two sub-hypotheses. There is a correlation between professional Internet use patterns and education and gender (H0.1). Further, there is a correlation between Internet use as entertainment medium and education and gender (H0.2).¹⁵ This research question is based on the data sets of ALLBUS. It is offered by GESIS for secondary data analysis.

¹⁵However the null hypothesis can stated as follows: There is no correlation between Internet use and education and gender. Same for the sub-hypothesis.



2 Materials and Methods

To test the previous hypothesis I use a data set from the year 2004 of the German GESIS.¹⁶ GESIS provides the ALLBUS, the German general Social Survey¹⁷ collects up-to-date data on attitudes, behavior, and social structure in Germany. Every two years since 1980 a representative cross section of the population is surveyed using both constant and variable questions. Each ALLBUS survey focuses on one or two main topics. The ALLBUS 2004 focuses on social inequality, health and digital divide. This 2004 data collection is the most recent containing the topic of technical progress and computers, respectively digital divide. This topic includes questions about attitudes towards modern technology, computers, and the Internet; time and place of first computer use; number of computers in the household; purpose of computer use; time spent using the computer; special computer skills; reasons for not using computers; Internet use; time and place of first Internet use; reasons for not using the Internet; Internet access at home; purpose of Internet use; time spent using the Internet; number of friends using the Internet; frequency of computer use at the workplace; Internet access at the workplace; Internet use at the workplace for job and for private purposes.¹⁸

As mentioned earlier, the total population is the Federal Republic of Germany. The sample consists of individuals of the selfsame country. The sample was conducted as follows: Two stage disproportionate random sample in western Germany (incl. West Berlin) and eastern Germany (incl. East Berlin) of all persons (German and non-German) who resided in private households and were born before 1 January 1986. In the first sample stage municipalities in western Germany and municipalities in eastern Germany were selected with a probability proportional to their number of adult residents. In the second sample stage individual persons were selected at random from the municipal registers of residents. Targeted individuals who did not have adequate knowledge of German to conduct the interview were treated as systematic unit non-responses. Personal interview with standardized questionnaire (CAPI - Computer Assisted Personal Interviewing) which includes 899 variables.¹⁹

¹⁶GESIS - Leibniz-Institut für Sozialwissenschaften. <http://www.gesis.org/>

¹⁷Allgemeine Bevölkerungsumfrage der Sozialwissenschaften

¹⁸ANDRESS, Hans-Jürgen et al.: ALLBUS 2004 - German General Social Survey. Köln: GESIS Datenarchiv, 2004.

¹⁹Ebd.



The overall response of the primary sampling units is as follows: The response rate for west Germany is 44,9% with 111 sample-points in 104 municipalities. The response rate for east Germany is 47,6% with 51 sample-points in 46 municipalities. The total sample size is 2946 respondents.

With the background of the ALLBUS data, I use parts of the framework provided by Barzilai-Nahon to analyse assumptions about the second-level digital divide. This includes the demographic variables gender and level of education of the respondents. On one hand it is assumed that "SEARCH FOR INFORMATION", "E-MAIL", "ONLINE BANKING" and "CREATE WEB PAGES" require a higher skill level. Therefore it is assigned in the category of "PROFESSIONAL INTERNET USE". On the other hand it is assumed that "SHOPPING", "TRAVEL, Chat ROOMS, ETC.", "ONLINE GAMING" and "DOWNLOAD MUSIC, FILMS" require a less higher skill level. Thus, it is assigned in the category of "INTERNET USE FOR ENTERTAINMENT".

I Ordinal independent variable (v60): GENERAL SCHOOL LEAVING CERTIFICATE

II Nominal independent variable (v55): SEX

III Ordinal dependent variable (v236-v242): INTERNET USE

a. Category 1: PROFESSIONAL INTERNET USE

- v236: SEARCH FOR INFORMATION
- v237: E-MAIL
- v240: ONLINE BANKING
- v243: CREATE WEB PAGES

b. Category 2: INTERNET USE FOR ENTERTAINMENT:

- v238: SHOPPING, TRAVEL
- v239: Chat ROOMS, ETC.
- v241: ONLINE GAMING
- v242: DOWNLOAD MUSIC, FILMS

The operationalization of the ordinal dependent variables (V236-V242) is as follows: The values are summed. Smaller values stand for a more frequent use. The sums are separated into three different ranges.



1. Characteristic values:

- 1 „EVERY DAY“
- 2 „AT LEAST 1X A WEEK“
- 3 „AT LEAST 1X A MONTH“
- 4 „LESS OFTEN“
- 5 „NEVER“

2. Value ranges:

- 4-8 (range 5)= FREQUENT USE
- 9-13 (range 5) = MODERATE USE
- 14-20 (range 7)= LITTLE USE

Furthermore, in consideration of the variable types I use the statistic methods of multidimensional contingency table. Further I use the significance level of 5% and Phi and CRAMERS-V for strength and direction of the correlation.



3 Results

The descriptive findings may indicate that higher educational qualifications be accompanied by a frequent professional use of the Internet for male respondents. Moreover, the findings for the group of female respondents do not show this clearly. This breaks down as follows.

professional use of the Internet * Graduation * RESPONDENT: SEX [count, column %].					
RESPONDENT: SEX		Graduation			Total
professional use of the Internet		without graduation + Hauptschulabschluss	Mittlerereife and others	at least Fachhochschulreife	
MALE	little or no prof. use	88.00 55.00%	126.00 48.28%	89.00 33.46%	303.00 44.10%
	average prof. use	65.00 40.63%	111.00 42.53%	138.00 51.00%	314.00 45.71%
	often prof. use.	7.00 4.38%	24.00 9.20%	39.00 14.66%	70.00 10.19%
	Total	160.00 100.00%	261.00 100.00%	266.00 100.00%	687.00 100.00%
FEMALE	little or no prof. use	53.00 63.06%	154.00 59.46%	100.00 45.87%	307.00 54.82%
	average prof. use	28.00 33.73%	98.00 37.84%	110.00 50.46%	236.00 42.14%
	often prof. use.	2.00 2.41%	7.00 2.70%	8.00 3.67%	17.00 3.04%
	Total	83.00 100.00%	259.00 100.00%	218.00 100.00%	560.00 100.00%

At least 14 % of the male respondents with at least "Fachhochschulreife" report an often professional Internet use. Nine percent with "Mittlerereife and others", and at least 4% of the male respondents "without graduation or Hauptschulabschluss" report an often professional use of the Internet. Moreover, The contingency table shows that 3% of female respondents with "at least Fachhochschulreife" report that they often use the internet professional. Three percent with "Mittlerereife and others", and 2% of the female respondents "without graduation or Hauptschulabschluss" report an often professional use of the Internet.

Chi-square tests.

RESPONDENT: SEX	Statistic	Value	df	Asymp. Sig. (2-tailed)
MALE	Pearson Chi-Square	26.65	4	.000
	Likelihood Ratio	27.73	4	.000
	Linear-by-Linear Association	25.53	1	.000
	N of Valid Cases	687		
FEMALE	Pearson Chi-Square	12.04	4	.017
	Likelihood Ratio	12.06	4	.017
	Linear-by-Linear Association	10.01	1	.002
	N of Valid Cases	560		

The chi-squared test for the male respondents has a highly significant correlation (.00 at $p > .05$). In the group of female respondents, the relationship is significant (.02 at $p > .05$). Thus, with a significance level of 5%, the null hypothesis is rejected for male and female respondents.



3 Results

Symmetric measures.

RESPONDENT: SEX	Category	Statistic	Value	Asymp. Std. Error	Approx. T	Approx. Sig.
MALE	Nominal by Nominal	Phi	.20			
		Cramer's V	.14			
	N of Valid Cases		687			
FEMALE	Nominal by Nominal	Phi	.15			
		Cramer's V	.10			
	N of Valid Cases		560			

The strength of the association is in the group of male respondents Cramer's $V = .14$, thus there is a medium association. In the group of female respondents there is a medium association, as well (Cramer's $V = .10$).

As mentioned above the research hypothesis H1 can therefore be confirmed and the null hypothesis H0 can be rejected. Thus, there is a relationship between high educational attainment and the frequency of professional Internet use. This relationship is in the Group of male respondents more pronounced than in the group of female respondents.

Use of the Internet for entertainment * Graduation * RESPONDENT: SEX [count, column %].

RESPONDENT: SEX		Graduation			
		without graduation + Hauptschulabschluss	Mittlerereife and others	at least Fachhochschulreife	Total
MALE	Use of the Internet for entertainment				
	little or no use as entertainment medium	150.00 93.75%	239.00 92.28%	245.00 92.11%	634.00 92.55%
	average use as entertainment medium	10.00 6.25%	18.00 6.95%	21.00 7.89%	49.00 7.15%
	frequent use as entertainment medium	.00 .00%	2.00 .77%	.00 .00%	2.00 .29%
Total		160.00 100.00%	259.00 100.00%	266.00 100.00%	685.00 100.00%
FEMALE	Use of the Internet for entertainment				
	little or no use as entertainment medium	81.00 97.59%	253.00 97.31%	213.00 97.71%	547.00 97.50%
	average use as entertainment medium	2.00 2.41%	6.00 2.31%	5.00 2.29%	13.00 2.32%
	frequent use as entertainment medium	.00 .00%	1.00 .38%	.00 .00%	1.00 .18%
Total		83.00 100.00%	260.00 100.00%	218.00 100.00%	561.00 100.00%

At least 92% of the male respondents with at least "Fachhochschulreife" report little or no use of the Internet as entertainment medium. Ninety-two percent with "Mittlerereife and others", and at least 93% of the male respondents "without graduation or Hauptschulabschluss" report little or no use of the Internet as entertainment medium. Moreover, The contingency table shows that 97% of female respondents with "at least Fachhochschulreife" report little or no use of the Internet as entertainment medium. Ninety-seven with "Mittlerereife and others", and 97% of the female respondents "without graduation or Hauptschulabschluss" report little or no use of the Internet as entertainment medium.

Those results for both groups may indicate that higher educational qualifications do not correlate with the use of the Internet as entertainment medium.



3 Results

Chi-square tests.

<i>RESPONDENT: SEX</i>	<i>Statistic</i>	<i>Value</i>	<i>df</i>	<i>Asymp. Sig. (2-tailed)</i>
MALE	Pearson Chi-Square	3.72	4	.445
	Likelihood Ratio	4.33	4	.364
	Linear-by-Linear Association	.25	1	.619
	N of Valid Cases	685		
FEMALE	Pearson Chi-Square	1.16	4	.884
	Likelihood Ratio	1.54	4	.819
	Linear-by-Linear Association	.05	1	.829
	N of Valid Cases	561		

The chi-squared test shows no significant relationship among the male respondents (.44 at $p > .05$). The group of female respondents also has no significant relationship (.88 at $p > .05$). Therefore, the null hypothesis can not be rejected. This means there is no relationship between the level of education and usage of the Internet as entertainment medium.

4 Discussion

The results support the stated hypothesis partially. The findings show, there is a positive correlation between professional Internet use patterns and education(H0.1). But the results show as well, there is no correlation between Internet use as entertainment medium and education and gender(H0.2). As stated in the introduction professional use goes hand in hand with a more sophisticated use of ICT. This supports the notion of the digital divide. Turning to gender differences for ICT use patterns, it seems as if the gender digital gap is slowly closing up. Those results support the findings from Korupp and Szydlik and their research on first level digital divide. Although the null hypothesis of H0.2 cannot be rejected, null hypothesis H0.1 can. Those findings disclose as well, that the labels of digital natives and net generation are simplified and do not hit the core of the issue. This show the age of the respondents as well. As stated in the section above, al respondents are older than year 1986. Furthermore, it seems the "Matthew effect" goes digital. Those who got a high education level benefit from ICT more than people with a low level education. This means that those who have an advantage in education, socioeconomic factors, etc., to expand it even more. Obviously, the digital divide goes hand in hand with other forms of social inequality. In the end this means while the gender gap is slowly closing, the second-level digital divide will become a pressing issue of the future. Notwithstanding, even this research support the thesis of the digital divide as an emerging socially structured digital differentiation, the research of Peter and Valkenburg expose that the disappearing of the digital divide is not completely illusionary. Their overall results suggest that the main prediction of the emerging digital divide are more convincing than the main predictions of the disappearing digital divide. Once access gaps are bridged, other gaps open or emerge. While the access and possession gap close, new digital differentiations move in. They also state that the new digital divide results from unequal socioeconomic and from varying cognitive resources, particularly from differences in formal education.²⁰

Nevertheless, there are some limitations of this research and it's assumptions. As we saw in the introduction one hand of the discussion, digital divide or digital inequality is focused on a binary classification of ICT and internet use. Distinguish those who

²⁰PETER, JOCHEN; VALKENBURG, Patti M.: Adolescents' internet use: Testing the "disappearing digital divide" versus the "emerging digital differentiation" approach. Poetics, 34 2006, Nr. 4–5.



have access and those who do not have access to ICT and the Internet. Regarding the general possession of ICT markets lowering the prices for technologies with higher capacities. So, the possession of Hardware increases. However this not prevent the growth of the digital divide. As van Dijk and Hacker argue Household income is still a important factor.²¹

On the other hand a more sophisticated analysis emerge from this topic. Regarding the skill and use of ICT. Learning digital skills will be a future challenge for the educational institutions. Like we see in this paper the kind of Internet usage patterns depends on education in Germany. Furthermore van Dijk and Hacker have observed effects of gender, age and ethnicity. Moreover, It is not enough to equip schools with new hardware, schools have to teach ICT skills and usage in a wide spectrum. This means not only teach abilities to operate Hard- and Software, further they have to teach skills like search, select, processing and apply information from digital sources or even some programming skills.²²

It also must be admitted that the used data set comes from the year 2004. It is not obvious in the year 2015, but as mentioned earlier it is the most recent data containing the questions on Internet use. All other ALLBUS surveys neglecting the issue of digital divide and digital inequality. Further research with newer data sets for Germany are absolutely necessary. Nevertheless at the moment, it will be assumed that the result will look similar. Furthermore, the selection of variables for data analysis on two independent variables and eight dependent variables was limited. As listed in the introduction, more variables are available in this 2004 survey. This means that a depth analysis may be performed, even with this 2004 survey. Moreover, the classification of these two categories is ambiguous. For example, chat may well have something in common with information searches. In addition, the search for offers for goods, services or trips certainly have something to do with sophisticated use of the Internet and search engines. On one hand, cultural goods, such as music and films, also contribute to the general education. On the other hand, higher education can lead to the enjoyment of more sophisticated music and films. Nevertheless, a classification had to be taken for this analysis. This applies in particular to the use of the Internet as an entertainment medium. A further point of criticism might be the current proliferation of smartphones and mobile devices. Through today's use of web-enabled smartphones, the Internet usage patterns could be different. Further studies are needed in this area, as well. Nevertheless as mentioned earlier, it will be assumed that the result will look similar.

²¹VAN DIJK: The Information Society 19 [2003].

²²HARGITTAI: New Economy Handbook 2003.



The use of social media is neglecting as well. This applies in particular for the use of facebook, twitter and so on. This is connected with the founding year of facebook in 2004. Already the use of social media is a research field sui generis.

Along with the stated arguments it needs to be questioned, that the level of education and gender are independent of each other. As Mohey-ud-din shows, both depend on each other.²³ Ultimately, the data analysis carried out here is purely static. To analyze the dynamics and changes over time, other methods are needed. Further research might analyze groups and partner effects of the digital divide, for instance. Computer-based social network analysis might provide such analysis. The complex perspective which were showed by van Dijk and Hacker may be analysed with this research approach. Those research may provide insights of development of ICT skills and usage over a time scale.²⁴

Finally, many research examine different countries. Further research must take this into account. First and second level digital divide differs in each country. Further, almost all of the cited literature notes that in the emerging field of digital divide further research is necessary to gain further insights of this young and fast growing field. One possible approach is to look at these issues from different perspectives. This includes research from the field of information technology management, marketing, strategic management, sociology, communications and public policy.²⁵

²³MOHEYUDDIN, Ghulam: Gender Inequality in Education: Impact on Income, Growth and Development. November 2005, Nr. 685 (URL: <http://ideas.repec.org/p/pramprapa/685.html>).

²⁴VAN DIJK: The Information Society 19 [2003].

²⁵RIGGINS, FREDERICK J.;DEWAN, Sanjeev: The Digital Divide: Current and Future Research Directions. Journal of the Association for Information Systems 6 2005, Nr. 12.



5 Notes

- **PSPP**

The survey data was analysed with psppire 0.8.5. It is a free replacement for the proprietary program SPSS, and appears very similar to it with a few exceptions.

<http://www.gnu.org/software/pspp/>

- **GitHub Repository**

To make the research reproducible and transparent all files were attached to a GitHub repository. This repository includes the questionnaire of ALLBUS2004 as well.

<https://github.com/cmplxCSS/StatisticalMethodsSPSS>

- **ALLBUS2004 GESIS**

The German General Social Survey (ALLBUS) is a biennial survey that has been conducted since 1980 on the attitudes, behaviour, and social structure of persons resident in Germany. This data collection (ALLBUS2004) is used as secondary data analysis.

<http://www.gesis.org/en/allbus/data-access/>



References

- ANDRESS, Hans-Jürgen et al.:** ALLBUS 2004 - German General Social Survey. Köln: GESIS Datenarchiv, 2004, ALLBUS 2004 (Nr. 3762, german version; Nr. 3764, english version)
- BADILLO, PATRICK-YVES; BOURGEOIS, Dominique:** Information and Knowledge Society and Network Economy: from Euphoria to reality. Economics For The Future
- BARZILAI-NAHON, Karine:** Gaps and Bits: Conceptualizing Measurements for Digital Divide/s. Inf. Soc. 22 2006, Nr. 5, 269–278
- BENNETT, SUE; MATON, Karl; Kervin Lisa:** The ‘digital natives’ debate: A critical review of the evidence. British Journal of Educational Technology, 39 2008, Nr. 5, 775–786
- DIJK, JAN; HACKER, Kenneth van:** The digital divide as a complex and dynamic phenomenon. The Information Society, 19 September 2003, Nr. 4, 315–326
- DIMAGGIO, PAUL; HARGITTAI, Eszter; Neuman W. Russel; Robinson John P.:** Social Implications of the Internet. Annual Review of Sociology, 27 2001, Nr. 1, 307–336
- HARGITTAI, Eszter:** Second-Level Digital Divide: Differences in People’s Online Skills. First Monday 7 2002, Nr. 4
- HARGITTAI, Eszter:** The Digital Divide and What To Do About It. New Economy Handbook, 2003, 821 – 843
- KENNEDY, TRACEY;WELLMAN, Barry;Klement Kristine:** Gendering the digital divide. IT Society, 1 summer 2003, Nr. 5, 72–96
- KORUPP, SYLVIA E; SZYDLIK, Marc:** Causes and Trends of the Digital Divide. European Sociological Review, 21 September 2005, Nr. 4, 409 – 422
- LOGES, Joo-young:** Exploring the Digital Divide: Internet Connectedness and Age. Communication Research, 28 August 2001, Nr. 4, 536–562



References

MOHEYUDDIN, Ghulam: Gender Inequality in Education: Impact on Income, Growth and Development. November 2005, Nr. 685 <URL: <http://ideas.repec.org/p/pramprapa/685.html>>

PETER, JOCHEN; VALKENBURG, Patti M.: Adolescents' internet use: Testing the "disappearing digital divide" versus the "emerging digital differentiation" approach. *Poetics*, 34 2006, Nr. 4–5, 293 – 305

RIGGINS, FREDERICK J.; DEWAN, Sanjeev: The Digital Divide: Current and Future Research Directions. *Journal of the Association for Information Systems* 6 2005, Nr. 12