Attitudes and the Digital Divide: Attitude Measurement as Instrument to Predict Internet Usage

Elisabeth Donat
Department of Sociology, University of Innsbruck, Austria
Elisabeth.Donat@uibk.ac.at

Roman Brandtweiner
Department of Information Systems and Operations, Vienna University of Economics and Business, Austria
Roman.Brandtweiner@wu-wien.ac.at

Johann Kerschbaum
Department of Sociology, University of Vienna, Austria
Johann.Kerschbaum@univie.ac.at

Abstract

Information and Communication Technologies (ICTs) are the most important way of getting informed in our society. Unfortunately not all people have access to the internet and ICTs (first order digital divide), and an amazingly large number of people do not have the abilities to use the ICTs in a proper way and, therefore, cannot draw advantages from its usage (second order digital divide). Clearly, whether people can be informed or not depends on access to the new media and the ability to use them. This paper shows that the variable attitude plays an important role in this context. Attitudes can serve as an important dimension when explaining the adoption and diffusion of new technologies. This paper presents data from a 2007 telephone survey in Austria and describes the attitude structure of users and non-users by means of a representative random sample (N=529). The tripartite definition of attitudes serves as a useful heuristic in structuring the analysis. In providing new operationalizations, we found significant differences between users and non-users concerning their attitudes towards the internet and new technologies. Age and education prove to be major determinants of attitude patterns. The influence of the affective component has to be especially emphasized, not only when overcoming the initial obstacle of getting online, but also when it comes to willingness to learn and become a sophisticated user (second order digital divide). Therefore our analysis gives starting points for intervention programs to encourage more people to use the net.

Keywords: Digital Divide, Representative Study, Attitude Theory and Measurement, Semantic Differential

Editor: Peter Rittgen

Introduction

"*The last half of the 1900s has been characterized by the increasing importance of information and communication technologies (ICTs) in social and organizational life*" (Sawyer & Rosenbaum, 2000). In the now established information society, it is crucial that people have access to the new media and know how to use the new ICTs. Without access to the internet and without the necessary skills that regularly go along with the attitude to use the new information technologies, people can neither inform themselves electronically nor can be informed by organisations and institutions using IT. This is why issues concerning the digital divide are of striking importance in this context, as pointed out by Elizabeth C. Boyd, "*As information technology is fast becoming a major tool for disseminating and obtaining information, gaps between those who have access to this tool and those who do not is a major concern*"(2002, p. 113).

Research on digital divide focuses first and foremost on the speed of various groups in adopting these new ICTs (Anderson, Bikson, Law, & Mitchell, 1995; Gehrke, 2004; Katz & Rice 2002; Katz, Rice, & Aspden 2001; Norris, 2001; Selhofer & Hüsing, 2002). The relation of demographics and internet usage is one of the major research questions in the field of digital divide. Phenomena like these can be subsummized under the so-called "first order digital divide" (Dewan & Riggins, 2005). The so-called "second order digital divide" addresses questions about different abilities to use the internet and draw advantages from its usage (DiMaggio, Hargittai, Neuman, & Robinson, 2001; Hargittai, 2002, 2003). Less research has been done in a third dimension of adopting new technologies, i.e. the field of attitudes towards the internet, although these attitudes play an important role in adoption and in learning how to use this new medium. Besides analyzing demographic characteristics of users and non-users we want to focus on the question of attitudes, especially of non-users in comparison to users, to acquire a deeper understanding of the process of "digital divide" and the adoption of new technologies.

Former studies investigating the digital divide used theories of diffusion and innovation as explanatory frameworks (Carveth & Kretchmer, 2002). Doubtlessly research like this provides useful and interesting information about the digital divide phenomenon. The explanatory strength of studies like this lies in explaining the causes and consequence of the first order digital divide. If we want to understand the second order digital divide, i.e. why people who theoretically have access to ICTs and Internet do not use these new media, we have to take a closer look at attitudes. This was already emphasized seven years ago by Burkett, Compton, and Burkett (2001). In another publication, they pointed out that *"... the impact of computer attitudes on computer knowledge is still a key component to the understanding of information science*" (Compton, Burkett, & Burkett, 2002, p. 219).

What do we know about attitudes towards the internet? To answer this question, unfortunately one has to refer to one of the several studies made that observe attitudes in populations of students (Jackson, Ervin, Gardner, & Schmitt, 2001; Li, Kirkup & Hodgson, 2001; Sam, Othman & Nordin, 2005) or even to one of the online-surveys addressing only current users. In our literature review we also found several studies about attitudes towards e-commerce – of course also focusing on a very specific section of the population. These target groups are specific and biased in a dimension of vital importance when discussing phenomena of digital divide: they certainly have a relatively high level of computer and internet literacy compared to the general population of a society. Therefore it is inappropriate to draw conclusions about internet attitudes and behaviour from such selective populations and to generalize from them. Studies using representative population samples are still scarce.

Research on attitudes has a very long tradition in social sciences, and techniques are becoming more sophisticated (Benninghaus, 1976, Krebs & Schmidt, 1993). Much effort has been made to refine questionnaires, scales and data analysis. Besides simply getting to know attitude patterns

and components of a population, there is a rather implicit goal that lies behind these efforts: the wish to explain behaviour by attitudes has always been one of the major desiderata in empirical research. Solving this problem also addresses an issue of justification for social sciences: if behaviour is influenced by attitudes, various ways to influence behaviour are open to practitioners and politicians.

Getting to know general attitude patterns towards the internet via a representative sample can help to obtain knowledge beyond demographic characteristics about factors which might hinder people from getting online. The measurement of attitudes is a considerably more difficult problem than measuring the influence of demographics on people's internet usage behaviour. Whilst dealing with attitudes, we have to find elaborated indicators to measure the latent phenomenon "attitude". Demographics, like age, gender, and income, are more manifest in their nature compared to attitudes. We also have to rely on respondents' answers on stimuli (i.e. questions) when asking for demographics, but this may yield more reliable answers (besides effects of social desirability). The verbal formulation of attitudes demands a great deal of introspection and abstract thinking on the part of the respondents. Attitudes are of course also influenced by social desirability, which we tried to reduce by using a telephone survey and design.

Theoretical Considerations

Talking about attitudes presupposes that there are attitudes to talk about. Although the question of non-attitudes is a very unpleasant issue for social scientists, our analysis would be incomplete and just a piece of empiricism (Mende, 2005) without addressing this question before discussing the basics of attitude theory. Social sciences have seen attitude theories employing mechanisms of rational thinking (Ajzen, 1993) and of a more spontaneous response towards attitude objects (Fazio, 1990). But what if there is actually no awareness of the phenomenon "internet"? We therefore asked respondents whether they actually knew what the internet is, and followed Katz and Rice (2002) in their considerations on issues of awareness. In leaving this "door" open to our respondents, we acknowledge the possibility of having no differentiated opinion on this issue.

There is not enough room to open up the whole discussion on attitude theory and measurement, so we will address only some basic considerations and open questions on these issues. A commonly agreed upon definition was proposed by Ajzen (1993), "*An attitude is an individual's disposition to react with a certain degree of favorableness or unfavorableness to an object, behavior, person, institution, or event – or to any discriminable aspect of the individual's world*." This definition points to a key element of attitudes: an evaluative dimension. Using scales to evaluate attitudes is a common way to obtain information about respondents' evaluations. Furthermore, attitudes are multidimensional in the sense that they include three components: a cognitive, an emotional, and a behavioural component (Rosenberg, Hovland, McGuire, Abelson, & Brehm, 1969). The cognitive component includes perceptions and knowledge of the attitude object, typically represented via stereotypes. The emotional or affective component represents feelings towards the attitude object, and the behavioural or conative component addresses questions of reacting towards the attitude object. Through accepting this definition of attitudes, one employs a multidimensional model of attitudes which can serve as a useful heuristic to structure analysis and data measurement.

As is often the case with heuristics, in practice we find exceptions; for example, the question whether attitudes are really best represented by a tripartite model or whether it would be preferable to construct a bipolar model (consisting of a cognitive and an affective component only). This question becomes even more important as the conative component is the most difficult to measure, when thinking about unidimensional and precise operationalizations. Ajzen (1993) suggests using behavioural intentions as an indicator for the conative component. In measuring hypothetical behavioural intentions, the problem becomes even more abstract and difficult for respon-

dents, and there is wide discussion whether we should rely on such non-committal, one moment measurements. Although there are recommendations (Ajzen, 1993) to stay as close as possible to the behaviour in question and to use a narrow time frame, we also tried to convey information on concrete, current behaviour and asked non-users for perceived barriers when it comes to internet usage.

According to commonly accepted knowledge on attitudes (Taylor, Peplau, & Sears, 1994) we expect attitudes towards internet to be cognitively complex and evaluatively simple. Especially when people do not know exactly what the internet is, they may have some basic feelings (good/bad) about it without many supporting cognitions. Although there should be some kind of coherence between the three attitude components, we also know that the relationship between them can be rather complex. Attitudes can influence behaviour, but we also infer our attitudes from our behaviour. Furthermore, two people reporting nearly the same beliefs on an attitude object can hold quite different cognitions, emotions, and conative predispositions towards it (Rosenberg et al., 1969). Nevertheless, altogether people seek some kind of consistency between cognitions, affect, and behaviour and apply mechanisms of dissonance reduction to reach this consistency.

Our paper aims to introduce some new possibilities of measuring attitudes towards the internet and is based on the heuristic of attitudes as tripartite constructs. In order to address questions of digital divide we concentrate especially on the views of non-users in comparison to users. This leads us to the following research questions:

- Basic information: which demographic variables influence the usage and non-usage of the internet?
- In which ways do users and non-users differ concerning their attitudes towards the internet in the three dimensions (cognitive, affective, and conative dimension)?
- What kind of influence do age and education have on attitudes towards the internet (the two main predictors on internet usage)?

On the basis of these general research questions, we can formulate the following hypotheses:

H1: High education, high income, and having children have positive effects on internet usage.

H2: We are hypothesizing negative influences of age (older age groups), gender (dimension female), migration background (country of birth not Austria), East-West (dimension West) on internet usage.

H3: Attitudes towards the internet show a tripartite structure, which is mainly influenced by current usage, age, and education.

Users, younger people and highly educated people will show more positive attitudes on the three subdimensions cognitive, evaluative, and conative components.

Methodology

The aim of our survey is to acquire a detailed picture of attitudes towards the internet and usage behaviour in Austria. Therefore, we did not rely on information gathered from easily accessible groups, such as students, but collected a representative sample of the Austrian population. Although the number of online surveys on issues of digital divide is growing, we decided to conduct our survey by telephone interviews, because we wanted to reach both users and non-users. In order to produce a representative sample, respondents were randomly chosen by the CATI-System (Computer Aided Telephone Interview) “Askme”. To avoid systematic drop-outs, “Askme” contacts several times people who were not reachable on first call or who agreed to give the inter-

view at a later time. The questionnaire was fully standardized, pretested, and developed after a phase of qualitative interviews, which provided useful hints about general attitudes towards the internet. We mixed already tested scales with newly developed scales and gave special attention to commensurabilty with existing survey programs and data sets in Europe (e.g. Eurobarometer). Interviews started with general questions about internet access and usage, then respondents answered questions about the internet in their social environment and computer literacy. We also asked about reasons for usage and non-usage and general attitudes towards the internet. Questions about technophobia, planned purchase of an internet access and, of course, demographics completed the questionnaire.

Sample Description and Descriptive Results

Our sample includes 529 people and contains slightly more women than men compared to the Austrian population census. Age and region correspond almost perfectly to the distribution of the population census with slightly more older than younger respondents (Table 1). To summarize, our sample shows a very high quality in comparison with the population census.

Table 1: Description of Sample

Gender	%	Age	%	Education	%
male	42.2	15 - 25 years	9.4	compulsory education	17.7
female	57.8	26 - 44 years	34.2	without high school diploma	41.6
		45 – 64 years	37.0	with high school diploma (~A-level)	24.8
		65 years +	19.5	university	15.8
	100		100		100

61% of the respondents currently use the internet. Growth rates in Austria for internet access at home are still increasing but the speed of growth seems to have slowed down somewhat during the last 5 years (Figure 1). Most users (82%) use the internet at home and about two thirds are

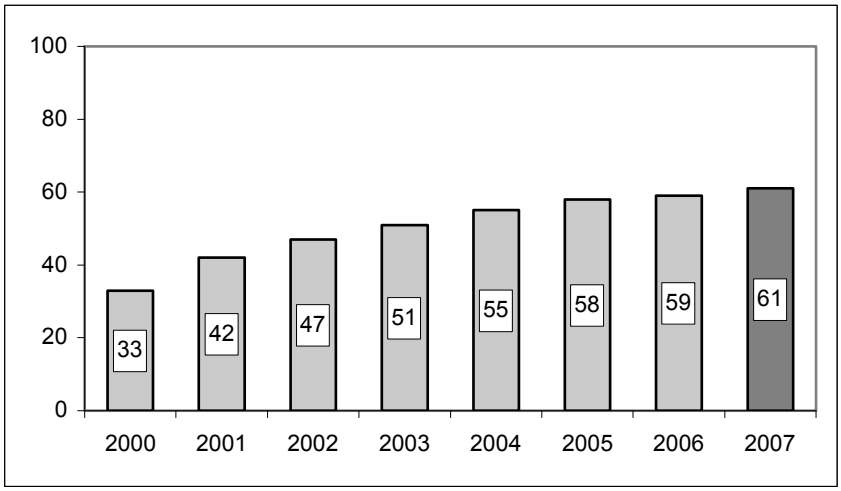

Figure 1: Percentage of internet users in Austria (2000-2006: AIM, 2007: own survey)

daily users. Mobile wireless usage of the internet is still at its beginnings, with 11% of the users reporting use of this kind of access. The main activities on the internet are e-mail, research, and communication with friends and family. Using the internet for reasons of work ranked only in fourth place. E-government and shopping on the internet are still quite unusual for nearly two-thirds of Austrian users. Quite interestingly, we also found that 73% of the users rated their English skills weak to medium.

Although we found quite a large proportion of "onliners", there are still 39% (206 persons) who said they did not use the internet. About 2% of our respondents can be described as "drop-outs" who had used the internet but are currently off-line. Besides having no computer and/or no internet access at home, computer literacy is one of the main barriers preventing non-users from getting online.

Interesting in this context is that recent research from Capgemini (2006) on the online availability of public services (e-government) shows that Austria has an overall average score on full availability of public services and sophistication of more than 90%. With this result Austria is the EU leader in providing e-services to its citizens. According to the Capgemini data, just 29% (Capagemini, 2006, p. 20) of the Austrian citizens are using these highly sophisticated and user friendly e-government services. The Capgemini figure corresponds to our data. As mentioned above, according to our sample E-government is still quite unusual for nearly two-thirds of the Austrians; the exact figure in our survey concerning the use of public services by Austrian citizens is 37.1%. These two figures - Capgemini's 29% from the year 2006 and our 37.1% from 2007 – show that apparently the availability of services and access to the internet alone is not enough to motivate the majority of people to use the internet and the online services provided. These findings show that, especially in developed nations, not the "first order digital divide" (i.e. access) but the "second order digital divide" is the main reason for low internet usage. The dominance of the "second order digital divide" highlights the importance of attitudes towards ICTs for internet usage. In a former publication it was shown that, beside access, computer literacy (i.e. competence) and motivation - defined by using three attitude variables that can be pooled into one factor using factor analysis –are responsible for the extent of ICTs usage within a society (Brandtweiner, Kerschbaum, & Donat 2008).

Results

We performed a logistic regression to get a first overview of the demographic structure of users and non-users (Table 2). The question, "Do you use a computer with internet access?" was used as the dependent variable and scaled from zero ("no") to one ("yes"). Age, gender, education, income, children at home, migration background, and region served as predictor variables. In order to use similar scale levels we categorized continuous variables like age and income. Our analysis shows strong, significant effects of age on internet usage. In comparison to the reference group 65+ years, people in the youngest age group are nearly 39 times more likely to be internet users. For respondents in the age group 26-44 years the probability of using the internet is almost 10 times greater than for the reference group. Even for the neighboring age group (45-64 years), the probability of being online is 7.66 times higher than for the reference group. Interestingly, we found no effects of gender on internet usage in our data set – this seems to indicate that the gender gap has already diminished in Austria. The predictor variable "education" has yielded very strong effects on the dependent variable internet usage. The higher the education level of a respondent, the greater the probability of being an internet user. Thus, respondents with only compulsory education have a 17.75 times lower probability of being internet users compared to respondents with a university degree. We can also observe a strong effect for the dummy variable "without high school certificate" and a much weaker but still significant effect for the group "with high school certificate". In this sense we can observe a gap in the education variable that

Table 2: Logistic regression on usage behaviour

	B	Sig.	Exp(B)	1/Exp(b)
Age (reference group 65+ years)		0.00		
15-25 years	3.66	0.00	**38.95**	
26-44 years	2.27	0.00	**9.64**	
45-64 years	2.04	0.00	**7.66**	
Gender (reference group female)	-0.26	0.36	0.77	
Education (reference group university)		0.00		
Compulsory education	-2.88	0.00	0.06	**-17.75**
Without high school certificate	-2.34	0.00	0.10	**-10.34**
With high school certificate	-1.30	0.03	0.27	**-3.68**
Per capita household income (reference group 4. quartile)		0.22		
1. quartile	-0.69	0.12	0.50	
2. quartile	-0.77	0.08	0.46	
3. quartile	-0.17	0.69	0.84	
Children (reference group no children)	1.00	0.01	**2.71**	
Migration background (reference group native Austrians)	-0.94	0.05	0.39	**-2.56**
Federal States: East-West (reference group East)	-0.73	0.01	0.48	**-2.07**
			Cox & Snell R^2: 0.321	
			Nagelkerke R^2: 0.434	

can be described by two groups: low education (up to no high school certificate) and high education (high school certificate and more). We have found no effects for income in our data set.

Korupp and Szydlik (2005) reported on the influence that children and ethnic background have on internet usage. In accordance with their results, having children at home significantly heightens the probability of using the internet. To test effects of race, we asked respondents about their country of birth and dichotomized afterwards in two categories “Austria” and “Non-Austria”. Compared to native Austrians, foreigners have a 2.56 lower probability of being internet-users. We checked for regional effects in dichotomizing the variable “postal code” into eastern and western regions (eastern regions: Vienna, Burgenland, Lower Austria, Styria) of Austria. Compared to the eastern region of Austria, the western, more rural regions of Austria have lower network coverage. This lower network coverage is of course also due to geographical reasons. Therefore, we found it less probable for residents of western provinces to be online compared to residents of the eastern provinces of Austria.

The Cognitive Component: Perceptions of the Internet

As a measurement technique we used Osgood’s semantic differential. With this technique one can measure the meaning of certain concepts. The semantic differential uses a scale between two bipolar words and the respondent is asked to mark his or her position on the scale between these two poles (Osgood, Suci, & Tannenbaum, 1957). We used the semantic differential in order to explore general perceptions of the internet among our respondents. These perceptions can be used as indicators for cognitive components of an attitude towards the internet. A semantic differential

allows attitudes to be conveyed in a very economical but meaningful way. Therefore, respondents had to rate the attitude object "internet" with nine pairs of polar attributes. We tried to use salient attributes that were investigated in our qualitative pre-study. Answers scaled from 1 "strongly agree" to 5 "strongly disagree". Comparing the means of users and non-users (Figure 2), we found a generally good evaluation of the internet with non-users' answers closer to negative attributes than users' answers. Concerning the attribute pairs "exhausting-relaxing" and "old-young" non-users score nearly the same. According to t-tests, all means differentiate significantly except the "old-young"-pair. The pairs "time-consuming–time-saving" and "exhausting–relaxing" differentiate only at p=0.05, all other significant pairs differentiate at p=0.01.

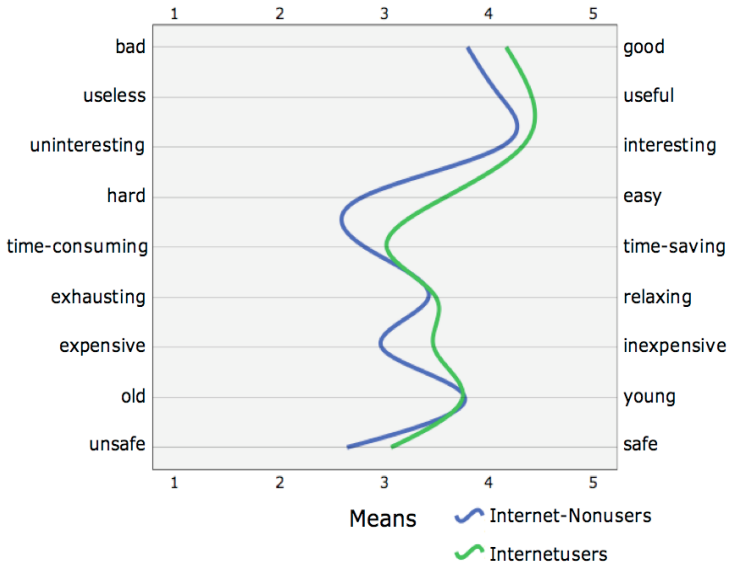

Figure 2: Semantic differential comparing users and non-users

The attribute pair unsafe-safe shows users regard the internet neither as safe nor as unsafe. The evaluation of the users is "neutral". Non-users regard the internet as more unsafe than users but, as Figure 2 shows, even the non-users have no strong reservations concerning the safety of the internet. A similar picture occurs when we look whether age plays an important role in regarding the internet as safe or unsafe. The age group "under 30 years" regards the internet safer than the age group "older than 50 years", but we can just observe a minor difference between the two groups. Obviously the perceived safety of the internet can't be the main reason why e-government and e-shopping are still quite unusual for nearly two-thirds of Austrian users.

Quite interesting differences were found when comparing age groups (Figure 3). For ease of visualization, we contrasted only two age groups: under 30 years and older than 50 years. Except for the attribute pair old–young, older respondents generally evaluated the internet in more negative terms. Especially attribute pairs concerning the perceived difficulty of the internet were rated more skeptically by older respondents.

From the findings of the two semantic differentials we can derive qualitative information on the real degree and context of attitudes relating to the evaluated group. If we remember the age structure of the internet users and non-users of our sample (see description at the beginning of the "Results" section) and compare the findings of the semantic differential to the real usage behavior, we can observe a very good fit. It is one of the strengths of the semantic differential to show whether a person's feeling towards an object is consistent with his or her behavior. The findings

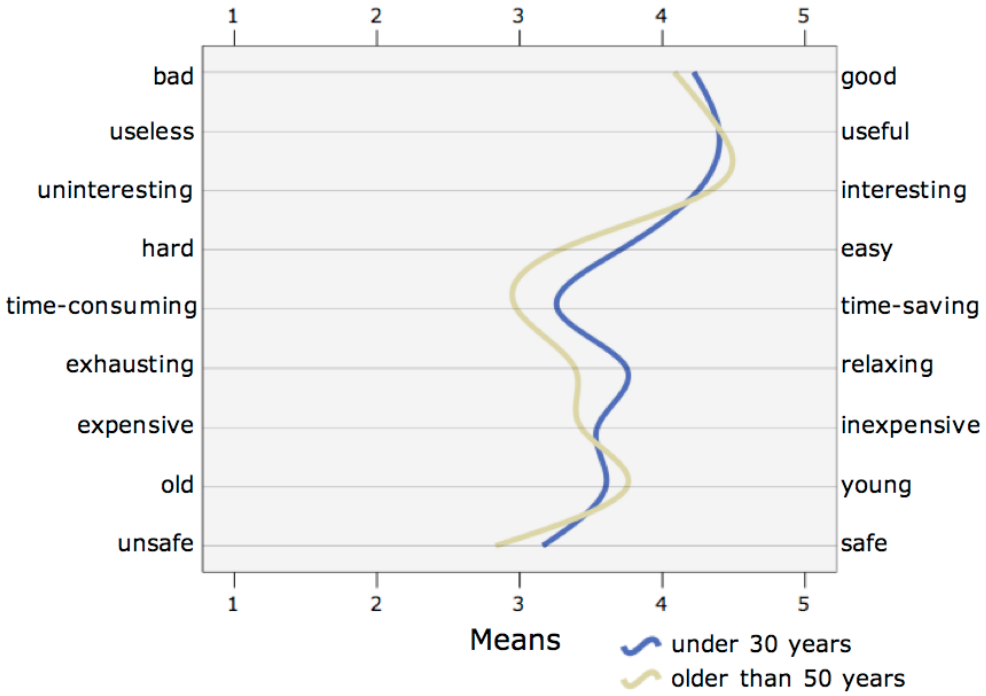

Figure 3: Semantic differential comparing younger and older respondents

in the next section, where we investigate the affective component (technophilia vs. technophobia) are consistent with these results.

In order to examine the structure of our semantic differential, we performed a factor analysis that yielded two distinct factors (Eigenvalue>1) with satisfactory amounts of explained variance (Table 3). The factors represent an evaluation of the internet on one hand and the perceived difficulty on the other hand. All other items did not show factor loadings above 0.5 and were therefore excluded from the analysis.

Table 3: Factor structure of the semantic differential

	Usefulness (45% of explained variance)	Difficulty (21% of explained variance)
exhausting - relaxing	0.13	**0.66**
difficult - simple	0.22	**0.58**
uninteresting - interesting	**0.65**	0.22
useless - useful	**0.70**	0.17
bad - good	**0.58**	0.14

"Usefulness" consists of the attribute pairs "uninteresting-interesting", "useless-useful" and "bad-good" and shows very basic cognitions about the internet. "Difficulty", including "exhausting-relaxing" and "difficult-simple" addresses issues of too low literacy among our respondents.

Feelings towards New Technologies – The Affective Component

Besides demographics and cognitive aspects, we were interested in the emotional component of the attitude towards the internet. Therefore, we applied a battery of items that should measure technophobia and vice versa interest for new techniques. To construct the item battery we used Sinkovics' (2006) Technophobia Scale as a guideline but also tried to include items which should address feelings of anomie and adherence to well-tried things. Our item battery includes both evaluative dimensions, positive feelings (e.g. technology optimism), and negative feelings (e.g. technology pessimism). We did not follow Sinkovics' scale in this point (unipolar composition of the scale) for two reasons. Firstly, we wanted to balance our items to construct a more neutral item battery. Secondly, we are aware of the fact that every survey is a kind of intervention in the field. Therefore, we also wanted to evoke positive feelings for technology in our respondents. Besides, this item battery came last in our questionnaire concerning attitude questions (before demographics), so we wanted to provide our respondents with the possibility to have at least a neutral end to these issues. The items followed after respondents had answered about 15 questions on their attitudes and internet usage behaviour, so that we can assume Halo-effects on these general questions about technique. We performed a factor analysis (principal axis, Varimax-Rotation) to see whether we had successfully reproduced the two hypothesized dimensions (Table 4).

Table 4: Factor analysis of affective components

	Technophilia (33% of explained variance)	Technophobia (27 % of explained variance)
I'm afraid of technical things.	-0.18	**0.50**
I always rely on well-tried things in my life.	-0.03	**0.53**
It's just fun to try new things.	**0.75**	-0.19
Technology makes life easier.	**0.55**	0.06
Today everything changes so fast that I can't get along with it.	0.08	**0.60**

We found two distinct factors (Eigenvalue >1), which can be described as "Technophilia" and "Technophobia," with satisfactory factor loadings above 0.5 and very small, even negative, cross-loadings. Again, the amount of explained variance is quite satisfactory at 60%. In the next step, we wanted to test whether users and non-users differentiated between these two attitude patterns. Because of normal distribution of the scale means, we computed t-tests in order to give some basic information about variation in the different groups. Non-users differentiate significantly from users in their scoring on the two scales. Education fosters computer literacy and leads to enlightenment and, thus, to a more open view towards new things: in our case, new technology. Therefore, we hypothesized that the higher the level of education, the more technophile our respondents would be. Secondly, we tested for age effects, assuming that technophobia would increase with increasing age of our respondents. We used Bonferroni Adjustment, due to the fact that Alpha-error cumulates when computing several paired comparisons. Bonferroni Adjustment adjusts the Alpha-level downwards, to consider chance capitalization in computing a coefficient of the global error rate divided by the number of tests. Means generally increased in the hypothesized direction, i.e. significant differences in age and education means concerning technophobia and technophilia except for technophilia concerning education (Table 5).

Table 5: Means on technophobia and technophilia items by age and education

	Technophilia (means)	Technophobia (means)
Non-Users	2.04**	2.68**
Reference group: Users	1.83	3.16
15-25 years	1.56**	3.44**
26-44 years	1.85**	3.20**
45-64 years	1.94**	2.78
Reference group: 65+ years	2.16	2.72
Compulsory education	2.01	2.88 **
Without high school certificate	1.92	2.83 **
With high school certificate	1.90	3.02**
Reference group: university	1.83	3.39

1=scoring high to 5=scoring low
**p=0.01 significant

Our results are in accordance with previous studies and indicate the importance positive feelings have in differentiating between users and non-users. Levine and Donitsa-Schmidt (1998) also emphasize the importance of a positive, fearless attitude as a precondition to get more people online, and DiMaggio et al. (2001) report that long-term users have specific personality traits that can be described as a kind of general openness or inquisitiveness, which may in turn lead to more positive feelings towards new technologies.

The Conative Component: Behavioural Intentions and Barriers

Ajzen (1993) suggests measuring the conative component of attitudes through questions about behavioural intentions. Besides this rather hypothetical question, we also concentrated on perceived barriers which might influence concrete, current behaviour.

Only 9.5% of the non-users are planning to get internet access at home during the next two years. We used a time frame of two years as a reference point in order to simplify this hypothetical question for our respondents, and, in formulating the question, we tried to remain as clear and close as possible to the behaviour we were interested in (getting internet access). What barriers prevent people from getting online? To get a satisfactory answer to this question we developed a battery of items that should measure perceived barriers. The listed items are those mentioned by respondents in qualitative interviews conducted in the explorative phase of our study. To measure the importance of the items we used a Likert Scale (Likert, 1932). The Likert Scale is a psychometric scale that is commonly used in survey research (Diekmann, 2007). The items are simply statements that the respondent is asked to evaluate. When responding to the items the respondents express their level of agreement or disagreement to the statements. We used a five point Likert Scale (five ordered response levels) reaching from “strongly disagree” via a neutral statement (“neither agree or disagree”) to “strongly agree”.

Most non-users say that it would be too laborious for them to get online (installing a connection, learning to use a PC and internet, etc.) and that they did not know how to use a computer (Table 6). There also seems to be no perceived benefit in using the internet. Costs, although ranking only in sixth place, are still an argument for about every third respondent not to get online, and 31.4% of the non-users still did not know what the internet really is. From our point of view, this fact points to a very problematic barrier for non-users. As Katz and Rice (2002) formulated, “*Good*

intentions and well-meaning efforts are only part of the equation. What we call the 'other digital divide' is awareness. Awareness is not simply hearing a word or a name. It also means being aware of what the internet can do to serve one's own ends." In this sense, awareness becomes a very urgent field for practitioners to bring more people to the net.

Table 6: Barriers hindering use of the internet

	%
Too laborious (to learn)	61.4
Don't know how to use a computer	52.9
Not interested	52.3
Not useful	42.5
No time	37.3
Too expensive	34.6
Don't know what the internet is	31.4
	N=153

Besides competence issues, the category "not interested" is for more than fifty percent of the non-users the main reason not to use the internet. This means not only that people simply do not want to get in touch with ICTs but also that there is no real pressure to do so, i.e. the non-users can obviously find all important information via alternative channels. This might be one of the main reasons why the digital divide has not disappeared in Austria 2007. Our research has shown that the barriers for using the Internet are manifold but so are the reasons why people use the Internet. Reasons for using the internet – for instance - may be to find general information about a subject and get access to special information that is not easily available elsewhere, to correspond with friends living abroad (email), to find software, to do some shopping or banking, to learn, to discuss with other people interesting topics, or to simply have fun. This numeration is generic and does not claim to be complete. It just points out what the internet is good for and what benefits some people may derive from being online. Interesting in this context is why so many people regard the internet as "not useful" (according to our data 42.5%) or as not useful enough that the disadvantages of getting familiar with it outweigh the advantages of being online. Obviously the non-users see no need for getting in touch with the internet and related technologies because the traditional ways, i.e. the ways they are used to (traditional media, like radio, television, news papers, and offices of government agencies (with satisfying opening hours) as well as "real world" retail shops), still exist and still function very well. According to our research we assume that elderly people especially think that the benefits of using the internet would not equalize the cost and expenditure of getting familiar with these new technologies.

We performed a factor analysis (principal axis factoring, Varimax-Rotation) to bundle the different barriers in two factors (Eigenvalue>1) that can be named "latent barriers" and "manifest barriers" (Table 7). Latent barriers are the perceived uselessness of the internet and no interest in the internet. Lack of computer literacy, lack of awareness and costs can be summarized as a factor "manifest barriers".

According to these results, we can formulate a need to work on manifest barriers to get more people online and to communicate the use the internet could have for potential users (latent barriers). As Stanley (2003) reported in her qualitative study, two out of five of her respondents did not see computer literacy as a means to an economically, socially or informationally enriched future. Communicating the benefits of the internet should be an important issue for intervention programs. Furthermore, Stanley (2003) hypothesizes that these attitudes are rather more superficial

Table 7: Factor analysis of barriers

	latent barriers (41% of explained variance)	manifest barriers (15% of explained variance)
No time	0.05	0.30
Too expensive	0.10	**0.62**
Don't know what the internet is	0.31	**0.50**
Don't know how to use a computer	0.37	**0.60**
Not useful	**0.63**	0.25
Not interested	**0.87**	0.13
Too laborious (to learn)	0.39	0.47

than elaborated considerations of the advantages and disadvantages, so that there is a need to invest in basic enlightenment.

Summary: The Key Findings

61% of the respondents currently use the internet. Most users (82%) use the internet at home and about two thirds are daily users. Mobile wireless usage of the internet is still at its beginnings with 11% of the users reporting use of this kind of access. Main activities on the internet are e-mail, research, and communication with friends and family. Although we found quite a large proportion of "onliners", there are still 39% who do not use the internet. About 2% of our respondents can be described as "drop-outs" who had used the internet but are currently off-line. Besides having no computer and/or no internet access at home, computer literacy is one of the main barriers preventing non-users from getting online.

- We found a strong effect of age on internet usage.
  Using people with an age of 65+ as reference group, we found out that people between 15 and 25 have an almost 39 times higher probability of being internet users. For persons in the age group between 26 and 44 it is almost 10 times higher, and even for people in the age group 45-64 it is 7.66 times higher.
- We found neither effects of gender nor of income on internet usage in our data set.
- We identified a very strong influence of "education" on internet usage.
  Respondents with only compulsory education have a 17.75 times lower probability of being internet users than respondents with a university degree.
- Having children at home heightens the probability of being an internet user by the factor 2.71.
- Foreigners (country of birth is not Austria) have a 2.56 lower probability of being internet-users than native Austrians.
- Compared to the eastern region of Austria, the western, more rural regions of Austria have lower internet usage rates.

As discussed above, attitudes play an important role in adoption and in learning how to use ICTs. Besides analyzing demographic characteristics of users and non-users we want to focus on the question of attitudes. We regard attitudes as multidimensional constructs in the sense that they include three components: a cognitive, an affective (emotional), and a conative (behavioural) component. The cognitive component includes perceptions and knowledge of the attitude object, typically represented via stereotypes. The affective component represents feelings towards the attitude object, and the conative component addresses questions of reacting towards the attitude object.

- Cognitive component
  We used a semantic differential to explore general perceptions of the internet among our respondents. Generally older respondents evaluated the internet in more negative terms. The factor analysis we performed, in order to examine the structure of the semantic differential, yielded two different factors: “usefulness” and “difficulty”. The factors represent an evaluation of the internet, on one hand, and the perceived difficulty, on the other hand.
- Affective component
  Besides demographics and cognitive aspects, we were interested in the emotional component of the attitude towards the internet. Therefore we applied a battery of items that should measure technophobia and vice versa interest for new techniques. We found two distinct factors which can be described as “Technophilia” and “Technophobia” We found out that non-users differentiate significantly from users in their scoring on the two scales (users are much more technophile). Additional findings are: The higher the level of education, the more technophile is the person; Technophobia increases with increasing age of our respondents.
- Conative component
  Only 9.5% of the non-users are planning to get internet access at home during the next two years. Besides this rather hypothetical question, we also concentrated on perceived barriers which might influence concrete, current behavior. We performed a factor analysis to bundle the different barriers in two factors that can be named “latent barriers” and “manifest barriers” (Table 7). Latent barriers are the perceived uselessness of the internet and no interest in the internet. Manifest barriers are lack of computer literacy, lack of awareness, and costs.

It is interesting to put these findings into a wider context, therefore we give a brief overview of the findings of the *Special Eurobarometer 293* (European Commission, 2008). The Eurobarometer survey was carried out in November and December 2007 and the interviews were conducted in all 27 member states of the European Union; 26,730 EU citizens were interviewed. According to the Special Eurobarometer 293, the average internet penetration rate within the EU in 2007 was 42%. The range reaches from penetration rates up to 80% (Netherlands) down to Bulgaria with 14%. In all countries the penetration rates in urban regions are higher than in rural regions, and the larger the household the higher is the probability of having internet access. The findings of this survey show that half of European households do not have internet access. The major reason is lack of interest; 45%of the respondents who do not have internet access gave this reason. Cost related reasons were also mentioned by a relatively high proportion of the respondents (for 13% the cost of buying the hardware is too high, and for 12% the monthly subscription cost is too high), and 8% do not know what the internet is. Only 9% of the non users are planning to get internet access during the next six months.

If we contrast the Eurobarometer findings with ours we can observe some congruities between Austria and the EU as a whole: households in urban regions are more likely to have internet access, large households (in our survey households with children) are more likely to have internet access than smaller ones. Also, some barriers for internet usage are identified by our study as well as by the Eurobarometer, i.e. lack of interest, cost related reasons, and lack of knowledge about exactly what the internet is. The proportion of non-users who intend to get internet access in the near future is low in both studies (Eurobarometer 9%, our survey 9.5%).

Conclusions

The data presented in the paper shows that about two thirds of the respondents are internet users and one third are non-users (see Figure 1); the digital divide has not disappeared in Austria 2007. Internet usage stills depends mainly on the user’s age but also on education, region, and migration background. According to these results it can be hoped that the digital divide is a phenomenon of

cohorts, but on the other hand especially effects of education are worrisome (Castells, 2001; Taylor, Zhu, Dekkers, & Marshall, 2003). Although it can be assumed that the digital divide will close further according to benchmarks like "access to the internet", it has to be assumed that differences in skills and sophistication of usage will persist (Donat, 2008). Therefore the meaning of education and educational programs must not be underestimated in this context (Butler, 2002). Education has the power to reshape attitudes in general and therefore also towards ICTs.

The analysis done in this paper shows that, besides objective, rather easy to tackle factors, attitudes play an important role. While cognitions can be rather concrete and attributes or stereotypes are easy to imagine for the respondents, emotions are comparatively more diffuse and harder to change. Perceived usefulness is still a striking argument for usage of this new media, as pointed out also by Smith (2008). Kabbar and Crump (2006) report that respondents with migration background perceived relative advantages of the internet, such as saving costs when communicating with family and friends overseas.

The role of the social environment has to be especially emphasized in the context of attitude change and persuasion. Salient reference groups serve as mulitplicators towards attitude change and, subsequently, to behavioural change. Positive attitudes, like perceived ease of usage, perceived usefulness, and the opinion that the internet is a "good thing," in general are not self-emergent. If our friends tell us that the internet is a good, useful, and time-saving thing we are more inclined to give it a try. This fact has been known ever since attitude theory was developed (first Hovland & Weiss, 1951; then Beninnghaus, 1976). The credibility of our friends and family is most important in decision-making situations. And we learn our behaviour even more in our families, which means if internet usage is natural for our parents we are also likely to adopt it (Donat, 2008).

Our paper discussed new ways to measure attitudes towards the internet and new technologies. Our measures are based on attitude theory and former studies; nevertheless, "*we recognize that other measures exist that may provide equally valuable information of a different sort and depth*" (Karsten & Roth, 1998). In comparison to other studies, we tried to focus our questions on concrete, current, and individual behaviour. We tried to distinguish attitudes concerning general effects internet usage might have on society from attitudes that concern one's own personal behaviour. Jackson et.al. (2003) used rather general statements to measure attitudes towards the internet, like "Using the internet helps children to do better in school" or "To participate in our society you need to use the internet." In our opinion, internet usage can only be predicted when asking about personal attitudes towards internet usage and expected outcomes for one's own life.

In general, our analysis showed a good evaluation of the attitude object "internet" in the Austrian population 2007. Besides this positive finding, we found significant differences between users and non-users and the various education and age groups concerning their attitudes towards the internet. Although the influence of demographics on usage behaviour is still remarkably high, future research should not forget about the effects of attitudes. Even when the initial obstacle of getting online has been overcome, attitudes can strongly influence people's willingness to learn more about the internet and become experienced users. This relation already addresses questions of the so-called "second order digital divide".

Besides non-users' general cognition that the internet is simply not useful to one's life, the influence of emotions and feelings towards the internet should not be underestimated. Cognitions and barriers (though also subjectively perceived) can be addressed in a rather rational way. Negative feelings that might hinder the acceptance of new technologies are much harder to overcome. Stanley (2003) hypothesizes that monetary cost as a primary barrier to ownership of an internet access obscures a more complex relationship between economics and attitudes. The persuasive influence of social reference groups like family and friends as highly credible and salient sources

has to be emphasized in the context of attitude change. Despite issues of attitude change, we have to deal with problems of social desirability when measuring the affective component of attitudes towards internet and computers.

Therefore recommendations for intervention programs on the basis of our results can be made as follows:

- Our results clearly show effects of sociostructural variables – although the percentage of users is growing, intervention programs still have to focus on deprived groups (elderly, low educated, low income, migration background, etc.)
- Despite recognizing "objective" barriers (access, literacy) attitudes play a major role in keeping people away from the net
- The affective component is especially hard to tackle using rational arguments; therefore, one should emphasise the important role of multiplicators and reference groups in convincing people of the value the internet can have for their lives

Our measurement instruments performed well in differentiating between users and non-users and can be seen as first attempts to open up the discussion for new ways of operationalization. The importance of using representative samples cannot be overemphasized when making conclusions about a society's population as a whole. Besides, researchers should not ignore questions of non-awareness and negative attitude, albeit they point to an unpleasant truth. Cognitive pretests could also give some useful hints on the quality of measurement (Prüfer & Rexroth, 2005). In another step, the influence of the three attitude components on the dependent variable internet usage should be compared with a structural equation model (Davis, Bagozzi, & Warshaw 1989; Levine & Donitsa-Schmidt, 1998).

There are still many questions to be answered by future research, especially the topic of non-users' reasons for not getting online. Standardized surveys are not the best way to address issues that require why-questions. Clearly, more qualitative studies have to be made to get a deeper understanding of non-users' feelings towards the internet (Stanley, 2003). Furthermore, it has to emphasized that non-users should not be seen as a completely homogenous group. Standardized surveys can help to gain a first impression of the group of non-users and their attitude patterns, but again qualitative research as an antecedence or a follow-up can substantially increase knowledge about this group. La Piere (1934/1967), a pioneer on quantitative and qualitative attitude research, once formulated clearly the shortcomings and advantages of both methods:

> "*The questionnaire is cheap, easy, and mechanical. The study of human behaviour is time-consuming, intellectually fatiguing, and depends for its success upon the ability of the investigator. The former method gives quantitative results, the latter mainly qualitative. Quantitative measurements are quantitatively accurate; qualitative evaluations are always subject to the errors of human judgement. Yet it would seem far more worthwhile to make a shrewd guess regarding that which is essential than to accurately measure that which is likely to prove quite irrelevant*."

Further Research

In the next steps of our research we have taken a closer look on the competence dimension of internet usage, especially on the ways of competence acquisition. We have developed a two-dimensional concept of e-literacy, consisting of basic skills like e-competence (technical use of a computer and the internet) and advanced skills like media competence (which addresses the more cognitive skills of the respondent). This two-dimensional approach can be seen as a useful heuristic in structuring empirical analysis, but also as a reflection of sociopolitical reality (manuscript currently under review). Additionally we have completed the data collection phase of a research

project that focuses on different ways of media competence generation within organizations and how the social and professional environment influences the learning processes of the employees (e.g. role of colleagues, formal trainings, and family members). Furthermore, we want to find out why people do or do not want to use the internet in their non-work activities, and also how their work activities influence their use or non-use of the internet at home.

In our current and previous research we followed the basic assumption that the Internet is and will be the most important source of information for everyone in modern, well-developed societies. Our research has shown that non-use of the Internet is not always due to lack of access but due to lack of competence and negative attitudes towards ICTs (Brandtweiner & Donat, 2007; Brandtweiner, Kerschbaum, & Donat, 2008; Donat, Brandtweiner, & Kerschbaum, 2007; Kerschbaum, Donat, & Brandtweiner, 2007). Due to the findings of our research we think that it is worth investigating whether certain groups prefer other channels of getting informed, not because of lack of access, competence, or negative attitudes towards technology, but because of the characteristics of the Internet (e.g. disclosure of personal information), i.e. the existence of formal and logical reasons to use other information sources for certain purposes. Special attention will be given to considerations about whether information accessible on the internet is accessible elsewhere without difficulties. Therefore, we have the intention to conduct a study that focuses on the analysis of who the most important target groups for Internet usage are and which groups have good reasons not to use the internet. The research will be conducted as a qualitative study by using a grounded theory approach.

References

AIM. (2007). Integral Market Research. *Austrian Internet Monitor*. Retrieved from http://www.integral.co.at/AIM/ueberblick.shtml

Ajzen, I. (1993). Attitude theory and the attitude-behaviour relation. In D. Krebs & P. Schmidt (Eds.), *New directions in attitude measurement*. Berlin, New York: De Gruyter.

Anderson, R., Bikson, T., Law, S., & Mitchell, B. (1995). *Universal access to e-mail: Feasibility and social implications.* Santa Monica, CA: RAND.

Benninghaus, H. (1976). *Ergebnisse und perspektiven der einstellungs-verhaltens-forschung (Results and perspectives of attitude and behavioral research)*. Verlag Anton Hain, Meisenheim am Glan.

Boyd, E. C. (2002). Introduction to the special series on the digital divide. *Informing Science: the International Journal of an Emerging Transdiscipline, 5*(3), 113-114. Retrieved from http://inform.nu/Articles/Vol5/v5n3p113-114.pdf

Brandtweiner, R., & Donat, E. (2007). *The digital divide: Any reason for enthusiasm. The case of Austria*, In *Proceedings of 20th Bled Conference. eMergence: Merging and Emerging Technologies, Processes and Institutions*, June 4-6, 2007.

Brandtweiner, R., Kerschbaum, J., & Donat, E. (2008). ACM: A new index to measure the digital divide. *International Journal of Electronic Business*, *6*(6), 590–610.

Burkett, W. H., Compton, D. M., & Burkett G. G. (2001). An examination of computer attitudes, anxieties, and aversions among diverse college populations: Issues central to understanding information sciences in the new millennium. *Informing Science: the International Journal of an Emerging Transdiscipline*, *4*(3), 77-85. Retrieved from http://inform.nu/Articles/Vol4/v4n3077-085.pdf

Capgemini. (2006). *Online availability of public services: How is Europe progressing? Web Based Survey on electronic public services. Report of the 6th Measurement, June 2006*. Retrieved from http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/online_availability_2006.pdf

Butler, T. (2002). Bridging the digital divide through educational initiatives: Problems and solutions. *Informing Science: the International Journal of an Emerging Transdiscipline*, *5*(3), 133-144. Retrieved from http://inform.nu/Articles/Vol5/v5n3p133-144.pdf

Carveth, R., & Kretchmer, S. B. (2002). Policy options to combat the digital divide in Western Europe, *Informing Science: the International Journal of an Emerging Transdiscipline*, *5*(3), 115-123. Retrieved from http://inform.nu/Articles/Vol5/v5n3p115-123.pdf

Castells, M. (2001). *Die internet-galaxie (The internet galaxy).* Heidelberg, Berlin: VS Verlag

Compton, D., Burkett, W. H., & Burkett, G. G. (2002). The prediction of perceived level of computer knowledge: The role of participant characteristics and aversion toward computers. *Informing Science: the International Journal of an Emerging Transdiscipline*, *5*(4), 219-224. Retrieved from http://inform.nu/Articles/Vol5/v5n4p219-224.pdf

Davis, F., Bagozzi, R., & Warshaw, P. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982-1002.

Dewan, S., & Riggins, F. (2005). The digital divide: Current and future research directions. *Journal of the Association for Information Systems*, *6*(12), 298-337.

Diekmann, A. (2007). Empirische sozialforschung. Grundlagen, methoden, anwendungen (Empirical social research. Principles, methods, and applications). Reinbek bei Hamburg: Rowolth Verlag.

DiMaggio, P., Hargittai, E., Neuman, W. R., & Robinson, J. (2001). Social implications of the Internet. *Annual Review of Sociology*, *27*, 307-336.

Donat, E. (2008). *Determinants of internet usage – An in-depth analysis of the digital divide.* Hamburg: Verlag Dr. Kovac.

Donat, E., Brandtweiner, R., & Kerschbaum, J. (2007). Attitudes as predictors for internet usage: A tripartite model of attitude measurement. In *Proceedings of the Computer Science and IT Education Conference: CSITEd*, November 16-18, 2007. Retrieved from http://csited.org/2007/18DonaCSITEd.pdf

European Commission. (2008). *Special Eurobarometer 293. E-communications household survey.* Retrieved from http://ec.europa.eu/public_opinion/archives/ebs/ebs_293_full_en.pdf

Fazio, R. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. *Advances in Experimental and Social Psychology*, *23*, 75-109.

Gehrke, G. (2004), Zwischen Teilung und Integration (Between separation and integration). In G. Gehrke (Ed.), *Digitale teilung – digitale integration (Digital separation – digital integration)* (pp. 31-45). München: Marl.

Hargittai, E. (2002). Second-level digital divide: Differences in people's online skills. *Firstmonday*, *7*(4).

Hargittai, E. (2003), Informed web surfing: The social context of user sophistication. In P. Howard & S. Jones (Ed.), *Society online: The Internet in context* (pp. 257-274). Sage Publications.

Hovland, C., & Weiss, W. (1951). The influence of source credibility on communication effectiveness. *Public Opinion Quarterly. 15*, 635-650.

Jackson, L., Ervin, K., Gardner, P., & Schmitt, N. (2001). Gender and Internet: Women communicating and men searching. *Sex Roles*, *44*(5/6), 363-379.

Jackson, L., von Eye, A., Barbatsis, G., Biocca, F., Zhao, Y., & Fitzgerald, H. (2003). Internet attitudes and Internet use: Some surprising findings from the HomeNetToo Project. *International Journal of Human Computer Studies, 59*, 355-382.

Kabbar, E. F., & Crump, B. J. (2006). The factors that influence adoption of ICTs by recent refugee immigrants to New Zealand. *Informing Science: the International Journal of an Emerging Transdiscipline*, *9*, 111-121. Retrieved from http://inform.nu/Articles/Vol9/v9p111-121Kabbar76.pdf

Karsten, R., & Roth, R. M. (1998). Computer self-efficacy: A practical indicator of student computer competency in introductory IS courses. *Informing Science: the International Journal of an Emerging Transdiscipline*, *1*(3), 61-68. Retrieved from http://inform.nu/Articles/Vol1/v1n3p61-68.pdf

Katz, J., & Rice, R. (2002). *Social consequences of internet use*. Cambridge: Cambridge University Press.

Katz, J., Rice, R., & Aspden, P. (2001). The Internet, 1995 - 2000: Access, civic involvement and social interaction. *The American Behavioral Scientist*, *45*, 405 – 423.

Kerschbaum, J., Donat, E., & Brandtweiner, R. (2007). Internet use from the perspective of the theory of planned behaviour. In *AMCIS 2007 Proceedings*. Paper 42. Retrieved from http://aisel.aisnet.org/amcis2007/42

Korupp, S., & Szydlik M. (2005). Causes and trends of the digital divide. *European Sociological Review*, *21*(4), 409-422.

Krebs, D., & Schmidt, P. (1993). *New directions in attitude measurement*. Berlin, New York: de Gruyter.

La Piere, R. (1967). Attitudes versus actions. In M. Fishbein (Ed.), *Readings in attitude theory and measurement* (pp. 26-32). John Wiley & Sons. (Original work published in 1934.)

Levine, T., & Donitsa-Schmidt S. (1998). Computer use, confidence, attitudes and knowledge: A Causal Analysis. *Computers in Human Behaviour*, *14*(1), 125-146.

Li, N., Kirkup G., & Hodgson B. (2001). Cross-cultural comparison of women students' attitudes toward the Internet and usage: China and the United Kingdom. *Cyber Psychology & Behaviour*, *4*(3), 415 – 426.

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology, 140*, 1–55.

Mende, J. (2005). The poverty of empiricism. *Informing Science: the International Journal of an Emerging Transdiscipline*, *8*, 189-210. Retrieved from http://inform.nu/Articles/Vol8/v8p189-210Mende.pdf

Norris, P. (2001). *Digital divide*. Cambridge University Press, Cambridge.

Osgood, C. E., Suci, G., & Tannenbaum, P. (1957). *The measurement of meaning*. Urbana, IL: University of Illinois Press.

Prüfer, P., & Rexroth, M. (2005). Kognitive interviews (Cognitive interviews). *ZUMA How to - No. 15*. Retrieved from: http://www.gesis.org/fileadmin/upload/forschung/publikationen/gesis_reihen/howto/How_to15PP_MR.pdf

Rosenberg, M., Hovland, C., Mc Guire, W., Abelson, R., & Brehm, J. (1969). *Attitude organization and change*. New Haven and London Yale University Press.

Sam, H. K., Othman, A. E. A., & Nordin, Z. S. (2005). Computer self-efficacy, computer anxiety, and attitudes toward the Internet: A study among undergraduates in Unimas. *Educational Technology & Society*, *8*(4), 205-219.

Sawyer, S., & Rosenbaum, H. (2000). Social informatics in the information sciences: Current activities and emerging directions. *Informing Science: the International Journal of an Emerging Transdiscipline*, *3*(2), 89-95. Retrieved from http://inform.nu/Articles/Vol3/v3n2p89-96r.pdf

Taylor, S. E., Peplau, L. A., & Sears, D. O. (1994). *Social psychology* (8th ed.). Englewood Cliffs: Prentice Hall.

Selhofer, H., & Hüsing, T. (2002). *The digital divide index - A measure of social inequalities in the adoption of ICT*. Bonn: sibis. Retrieved from http://sibis-eu.org/files/Huesing_Selhofer_DDIX_2002.pdf

Smith, T. J. (2008). Senior citizens and e-commerce websites: The role of perceived usefulness, perceived ease of use, and web site usability. *Informing Science: the International Journal of an Emerging Transdiscipline*, *11*, 59-83. Retrieved from http://inform.nu/Articles/Vol11/ISJv11p059-083Smith447.pdf

Sinkovics, R. (2006). Technophobie-skala (Technophobia scale). In Glöckner-Rist A. (Ed.): *ZUMA-Informationssystem.Vers. 10.00 (ZUMA information system, Version 10.00)*. Mannheim: ZUMA.

Stanley, L. (2003). Beyond access: Psychosocial barriers to computer literacy. *The Information Society*, *19*, 407-416.

Taylor, W. J., Zhu, G. X., Dekkers, J., & Marshall, S. (2003). Socio-economic factors affecting home internet usage patterns in Central Queensland. *Informing Science: the International Journal of an Emerging Transdiscipline*, *6*, 233-246. Retrieved from http://inform.nu/Articles/Vol6/v6p233-246.pdf

Biographies

Elisabeth Donat works at the Department of Sociology at the University of Innsbruck. She is also a Lecturer at the University of Vienna, Institute of Sociology where she teaches empirical research methods. Until January of 2008 she was a research fellow at the Danube University in Krems. She is a Sociologist by profession and her research interests are urban studies, diffusion and adoption of new media, migration, and health.

Roman Brandtweiner is an Associate Professor at the Vienna University of Economics and Business Administration, Department of Information Systems. From June 2002 to November 2007, he has been a faculty member of the Danube University Krems (Austria). He was Professor for General Management and Business Communications. He is currently working on managerial and social aspects of IT & IS, applied media theory and digital divide issues. He is author of three books and several scientific papers (published for instance in the International Journal of Electronic Commerce and in Elektronic Markets).

Johann Kerschbaum is sociologist and lecturer at the University of Vienna, Institute of Sociology. He teaches empirical research methods, surveying and data analysis. His research focuses on issues of advanced data analysis, e-health and transport.