

# Attitudes as Predictors for Internet Usage: A Tripartite Model of Attitude Measurement

*Elisabeth Donat and  
Roman Brandtweiner  
Danube University,  
Krems, Austria*

*Johann Kerschbaum  
University of Vienna,  
Vienna, Austria*

[elisabeth.donat@donau-uni.ac.at](mailto:elisabeth.donat@donau-uni.ac.at)  
[roman.brandtweiner@donau-uni.ac.at](mailto:roman.brandtweiner@donau-uni.ac.at)

[johann.kerschbaum@univie.ac.at](mailto:johann.kerschbaum@univie.ac.at)

## Abstract

In addition to the so-called first order and second order digital divide, attitudes can serve as an important third dimension when explaining the adoption and diffusion of new technologies. This paper presents data from a recent telephone survey in Austria 2007 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. Especially the influence of the affective component has to be 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

## Introduction

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; 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 subsummed 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, 2004; 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

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tages from its usage (DiMaggio, Hargittai, Neuman, & Robinson, 2004; 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.

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 which 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 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 which 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, income etc. 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 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 respondents 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 (Shelley, Peplau, & Taylor, 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 people several times who were not reachable on first call or who agreed to give the interview 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 commensurability 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 elder than younger respondents (Table 1). To summarize, our sample shows a very high quality in comparison with the population census.

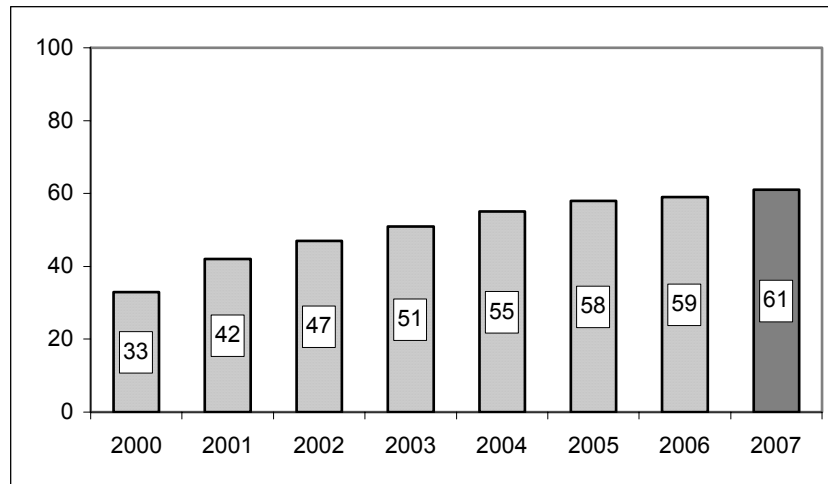
**Table 1: Sample description**

<b>Gender</b>	<b>%</b>	<b>Age</b>	<b>%</b>	<b>education</b>	<b>%</b>
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 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. 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.



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

## 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 neighbouring 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 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 more weaker but still significant effect for the group “with high school certificate”. In this sense we can observe a gap in the education variable which 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 Szydlík (2005) reported on the influence 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.

**Table 2: Logistic regression on usage behaviour**

	<b>B</b>	<b>Sig.</b>	<b>Exp(B)</b>	<b>1/Exp(b)</b>
<b>Age (reference group 65+ years)</b>		0.00		
15-25 years	3.66	0.00	<b>38.95</b>	
26-44 years	2.27	0.00	<b>9.64</b>	
45-64 years	2.04	0.00	<b>7.66</b>	
<b>Gender (reference group female)</b>	-0.26	0.36	0.77	
<b>Education (reference group university)</b>		0.00		
Compulsory education	-2.88	0.00	0.06	<b>-17.75</b>
Without high school certificate	-2.34	0.00	0.10	<b>-10.34</b>
With high school certificate	-1.30	0.03	0.27	<b>-3.68</b>
<b>Per capita household income (reference group 4. quartile)</b>		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	
<b>Children (reference group no children)</b>	1.00	0.01	<b>2.71</b>	
<b>Migration background (reference group native Austrians)</b>	-0.94	0.05	0.39	<b>-2.56</b>
<b>Federal States: East-West (reference group East)</b>	-0.73	0.01	0.48	<b>-2.07</b>

Cox & Snell R<sup>2</sup>: 0.321

Nagelkerke R<sup>2</sup>: 0.434

### ***The Cognitive Component: Perceptions of the Internet***

A semantic differential was used 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 attrib-

ute 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.

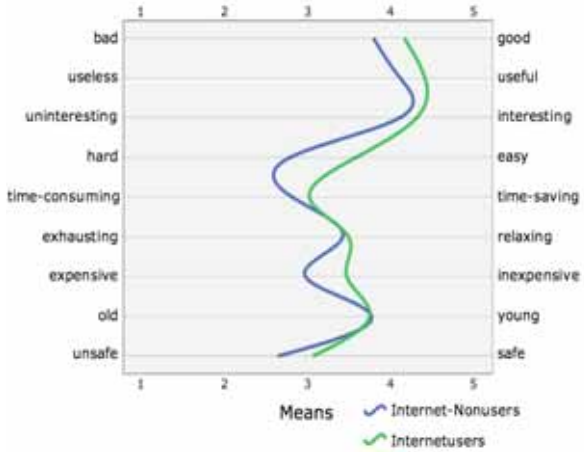


Figure 2: Semantic differential comparing users and non-users

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 sceptically by older respondents.

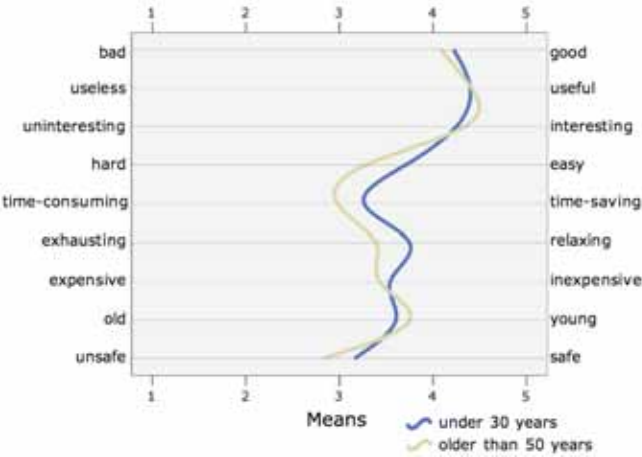


Figure 3: Semantic differential comparing younger and older respondents

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	<b>0.66</b>
difficult - simple	0.22	<b>0.58</b>
uninteresting - interesting	<b>0.65</b>	0.22
useless - useful	<b>0.70</b>	0.17
bad - good	<b>0.58</b>	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 that 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	<b>0.50</b>
I always rely on well-tried things in my life.	-0.03	<b>0.53</b>
It’s just fun to try new things.	<b>0.75</b>	-0.19
Technology makes life easier.	<b>0.55</b>	0.06
Today everything changes so fast that I can’t get along with it.	0.08	<b>0.60</b>

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 Schmidt (1998) also emphasize the importance of a positive, fearless attitude as a precondition to get more people online and Di Maggio et.al. (2001) report that long-term users have specific personality traits which 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? Most non-users quote 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

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”.

**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	<b>0.62</b>
don't know what the internet is	0.31	<b>0.50</b>
don't know how to use a computer	0.37	<b>0.60</b>
not useful	<b>0.63</b>	0.25
not interested	<b>0.87</b>	0.13
Too laborious (to learn)	0.39	0.47

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 hypothesizes that these attitudes are rather more superficial than elaborated considerations of the advantages and disadvantages, so that there is a need to invest in basic enlightenment.

## Conclusions

Our paper discussed new ways to measure attitudes towards the internet and new technologies. 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 affects towards the internet should not be underestimated. Cognitions and barriers (though also subjectively perceived) can be addressed in a rather rational way. Negative feelings which 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. In a world where computers and internet are almost omnipresent, one can hardly admit to having negative feelings towards these developments.

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
- Especially the affective component is hard to tackle using rational arguments; therefore one should emphasise the important role of multipliers 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 non-attitude, albeit they point to an unpleasant truth. Cognitive pretests could also give some useful hints on the quality of measurement (Prüfer and 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 (Levine and Donitsa-Schmidt 1998; Davis, Bagozzi, Warshaw 1989).

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 which 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 be emphasized that non-users should not be seen as a completely homogenous group in itself. 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), 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.”*

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## Biographies



**Elisabeth Donat** is a research assistant 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. Besides those topics, she is very much interested in methodological issues and multivariate data analysis.



**Roman Brandtweiner** (born 1967) received a master's degree in Media and Communication Science (1992) and a PhD (1994) from the University of Vienna. He further holds a master's degree (1993) and a DBA (1996) from the Vienna University of Economics and Business Administration (Austria) where he was associate professor at the Department of Management Information Systems. Since June 2002 he has been a faculty member of the Danube University Krems (Austria). He is professor for General Management and Business Communications and the director of the Danube University's Business School. He is currently working on managerial and social aspects of e-government, 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 Electronic 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.