

This just in: Analysis of factors influencing online newspaper reading behaviour



**Afstudeerscriptie
Sander Schoneville**

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online newspaper reading behaviour**

Datum: 19-2-2007

**Auteur: Sander Schoneville
s0007994**

Psychologie

Universiteit Twente, Enschede

Afstudeercommissie: Drs. O. Peters

Dr. A. Heuvelman

Summary

Research on the interplay between print and online newspapers is abundant. However, determinants of the usage of an online newspaper have seen little research attention. Hence the following research question was formulated: What factors influence the usage of online newspapers and how do they relate to each other?

To structure the research the Unified Theory of Acceptance and Use of Technology (UTAUT) model was used. It consists of four factors which influence the intention to use and actual use behaviour: performance expectancy, effort expectancy, social influence and facilitating conditions. After a literature study the model was expanded upon with the concepts of attitude, habit and counterintentional habit. Counterintentional habit was operationalized as the habit of reading a print newspaper.

Data collection made use of an online questionnaire about an online newspaper. Invitations to participate in the survey were sent to 2314 people in the Dutch summer vacation of 2006, of whom 990 responded (a response rate of 39%). Of these 990 returned questionnaires, 723 were usable. Respondents who did not know the online newspaper were filtered out.

The data were analyzed using Structural Equation Modeling. The initial research model was not accurate enough. Based on theory and empirical literature, the model was improved upon until a well-fitting final model was found.

Habit turned out to be the most influential determinant of intention and behaviour. Many studies that want to explain the use of media and technology do not include habit. This can lead to serious misinterpretations.

Unexpectedly, effort expectancy and attitude had no influence on intention to use. Additionally the habitual reading of a print newspaper turned out to have a *positive* influence on the intention to read an online newspaper. The final model showed that for online newspapers, intention is influenced by performance expectancy, habit and the habit of reading a print newspaper. Use behaviour was influenced by intention and habit. These are conscious and unconscious processes respectively, where the latter played a bigger part.

Samenvatting

De wisselwerking tussen gedrukte en online kranten is veelvuldig onderzocht. Wat mensen beweegt om een online krant te lezen is echter nog weinig onderzocht. Vandaar dat de volgende onderzoeksvraag geformuleerd is: Welke factoren beïnvloeden het gebruik van een online krant, en hoe verhouden deze zich tot elkaar?

Om het onderzoek te structureren is gebruik gemaakt van het Unified Theory of Acceptance and Use of Technology (UTAUT) model. Dit model heeft vier factoren die gebruiksintentie en gedrag beïnvloeden: performance expectancy (verwachte prestaties), effort expectancy (gebruiksgemak), social influence (sociale invloed) en facilitating conditions (randvoorwaarden). Na een literatuuronderzoek is het model uitgebreid met de begrippen attitude, habit (gewoonte) en counterintentional habit. Counterintentional habit is geoperationaliseerd als de gewoonte om de gedrukte krant te lezen.

De dataverzameling verliep door gebruik te maken van een online enquête over een online krant. Uitnodigingen voor deelname zijn in de zomervakantie van 2006 naar 2314 mensen gestuurd, van wie er 990 reageerden (een response rate van 39%). Van deze 990 ingevulde enquêtes waren er uiteindelijk 723 bruikbaar. Respondenten werden gefilterd op basis van het kennen van de online krant. De data werden geanalyseerd middels Structural Equation Modeling. Het vooraf gedefinieerde model bleek niet nauwkeurig genoeg; op basis van theorie en empirische literatuur is naar een passend eindmodel toegewerkt.

Gewoonte bleek de grootste voorspeller van intentie en van gedrag te zijn. In veel onderzoeken die zich richten op het verklaren van gebruik van media en technologie wordt gewoonte niet meegenomen als factor, wat sterk vertekende resultaten kan opleveren. Onverwacht was dat gebruiksgemak en attitude geen invloed hadden op gebruiksintentie. Daarnaast bleek het lezen van een gedrukte krant een *positieve* uitwerking te hebben op de intentie om de online krant te lezen. Het uiteindelijke model liet zien dat, in de context van online kranten, intentie wordt bepaald door verwachte prestaties, door gewoonte, en door de gewoonte van het lezen van een gedrukte krant. Gebruiksgedrag werd bepaald door intentie en gewoonte, met andere woorden door bewuste en onbewuste processen. Hierbij speelden laatstgenoemde een grotere rol.

Voorwoord

Iets meer dan een jaar geleden begon ik met mijn afstuderen voor psychologie. Soms ging het vlot, soms wat minder. De tijd vloog als ik literatuur ging zoeken of bezig ging met de modellersoftware. Alles in een ooglik artikel forceren, was echter geen sinecure. De APA-layoutverplichtingen en ik hebben geregeld een handgemeen gehad.

Ik wil mijn afstudeerbegeleiders, Oscar Peters en Ard Heuvelman, bedanken voor hun uitleg, suggesties en kritische blik. Gedragsmodellering is een interessant maar lastig veld en de hulp was dan ook belangrijk om valkuilen te vermijden.

Verder wil ik TC Tubantia en het onderzoeksbureau Newcom bedanken voor de mogelijkheid de enquête online te plaatsen en de moeite die daarvoor genomen is, in het bijzonder door Willem Pfeiffer, Helen Zuurmond en Ivo Duchateau. Zonder het grote aantal respondenten zouden de statistische procedures in mijn onderzoek een stuk lastiger uit te voeren zijn.

Mijn vrienden wil ik ook bedanken, voor de momenten van ontspanning in soms gejaagde tijden. Tenslotte een dankwoord aan mijn ouders en broertje, voor het getoonde vertrouwen en hun steun.

Sander Schoneville

Enschede, 18-2-2007

Running head: FACTORS INFLUENCING ONLINE NEWSPAPER READING BEHAVIOUR

This Just in: Analysis of Factors Influencing
Online Newspaper Reading Behaviour

Sander M. Schoneville
University of Twente

Abstract

This study uses a model based on the Unified Theory of Acceptance and Use of Technology (UTAUT) to analyze determinants of online newspaper usage. The original UTAUT model was extended by including attitude, habit and counterintentional habit. Readers of an online newspaper (n=723) completed an online questionnaire. The data were analyzed using structural equation modeling. The explained variance amounted to 38% for intention and 51% for use behaviour in the final model. Habit had a larger effect on use behaviour than intention and it was also the most important determinant of intention. Unexpected findings regarding social influence and counterintentional habit are discussed.

This Just in: Analysis of Factors Influencing
Online Newspaper Reading Behaviour

The diversity of communications media is increasing. In the past decade the biggest new media to surface were mobile telephony and the Internet. New media are causing a shift from analogue, separately used print media and audiovisual media to integrated electronic media (Van Dijk, 2006). For example, mobile telephones now feature functions for digital photography, playing music, chatting and web browsing. The Internet essentially covers all of the functions of other existing communications media: it facilitates listening to radio broadcasts, watching television, making phone calls, looking up information or reading the news.

This article will report on a study of the factors influencing the usage of a specific part of the Internet: online newspapers. There is a lot of discussion about whether the new media replace or complement existing media. As media converge more and more presentation-wise (Cooke, 2005), they will tap into each other's market segments more and more. After a longitudinal study on media use that spanned decades, Huysmans, De Haan and Van den Broek (2004) conclude that it is perhaps best to speak of an increasing but still partial replacement of older media. This notion is also supported for the case of online versus print newspapers, which are even considered to be complementary goods by some (Chyi & Lasorsa, 2002; Deleersnyder et al., 2002; Li, 2003). Even though the interplay between online and print newspapers has been widely discussed, Boczkowski (2003) noted a lack of structured research on factors influencing an individual's use of an online newspaper. Hence the research question for the current study was: What factors influence the usage of online newspapers and how do they relate to each other?

To structure the research the Unified Theory of Acceptance and Use of Technology (UTAUT) model will be used. The UTAUT model is a model developed by Venkatesh, Morris, Davis & Davis (2003). Venkatesh et al. (2003) aimed to explain IT adoption and usage in an organizational setting. However, several of the theories that form the basis for the UTAUT model have origins outside of organizational settings (Welmers, 2005). In a literature survey Kwong et al. (2002) showed that the Technology Acceptance Model, followed by Theory of Planned Behaviour and the Theory of Reasoned Action were used most for research in the online consumer context. All of these theories are indirectly represented in the UTAUT model. The

UTAUT was successfully used outside of an organizational context in a number of studies, for instance in a study on Instant Messenger use by Lin, Chan and Jin (2004) and in a study on digital radio use by Welmers (2005).

Online newspapers are an established medium in developed countries (d’Haenens, Heuvelman & Jankowski, 2004). Several researchers have expressed concerns about applying technology acceptance models to situations in which the technology is already diffused (Lin, Chan & Jin, 2004). Luckily, Lin, Chan and Jin (2004) found that the UTAUT model still has high explanatory power when used to research an already adopted technology.

For a discussion of the original UTAUT model, the reader is referred to Venkatesh et al. (2003). The research model for the present study can be found in Figure 1, and Table 1 shows the definitions for the concepts included in the model. The definitions of the concepts of the original UTAUT model were adjusted to fit an online newspaper setting and some structural additions were made: Attitude, habit, and counterintentional habit were added, and voluntariness was removed as a moderator. Motivations for these alterations are given below.

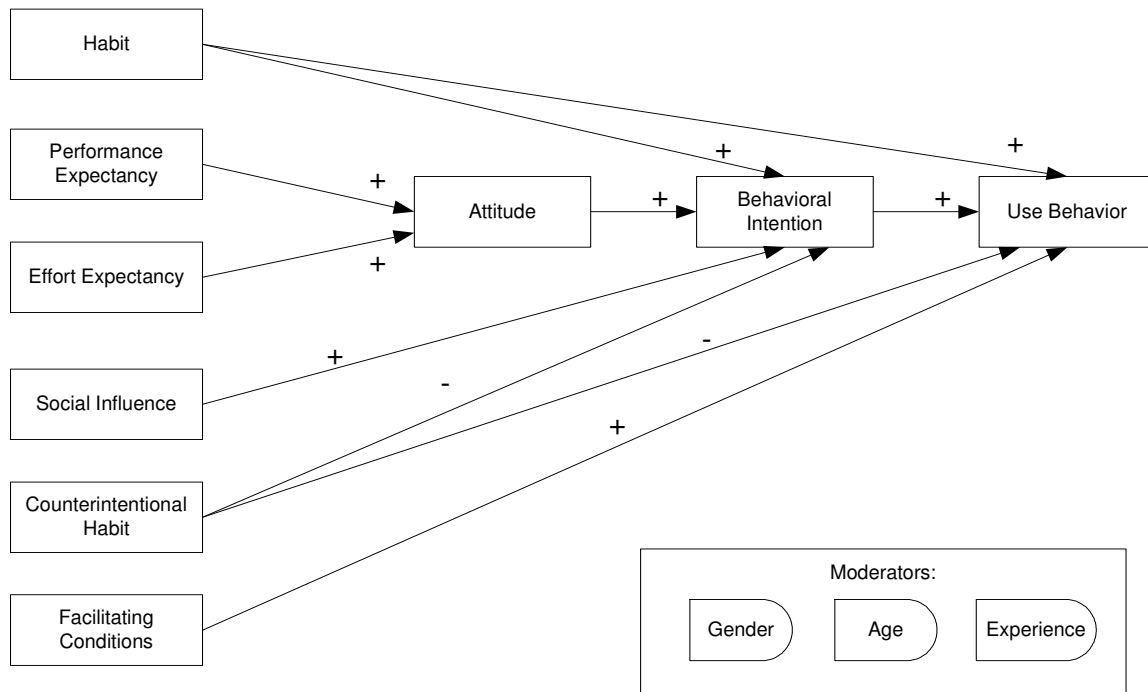


Figure 1. Research model.

Following Chin’s (1998) recommendation, hypotheses for the relations in the model will not be given as they can be derived from the research model. An expectation that cannot be derived

from the model is that it is expected to have better fit and explain more variance in intention and use than the original UTAUT.

Table 1. *Definitions of concepts in the research model.*

Concept (abbreviation)	Definition
Performance Expectancy (PE)	The degree to which the online newspaper is regarded as useful and better than alternatives.
Effort Expectancy (EE)	The degree to which the online newspaper is regarded as easy to use and read.
Social Influence (SI)	The degree to which important persons influence a subject's decision to use the online newspaper.
Facilitating Conditions (FC)	The degree to which constraints to the use of the online newspaper are perceived.
Attitude (ATT)	An individual's overall (affective) reaction to using a system.
Habit (H)	The extent to which using the online newspaper has become automatic in response to certain situations.
Counterintentional Habit (CH)	The extent to which using alternatives to the online newspaper has become automatic in response to certain situations.
Behavioural Intention & Use Behaviour (INT and USE)	The extent of deliberate determination of use behaviour, and the participant's actual use behaviour.
Gender/Age [moderators]	A person's gender and age.
Experience [moderator]	The degree to which somebody has used the medium.

The role of attitude as a predictor of intention and usage in the UTAUT was spurious according to Venkatesh et al. (2003) and they ultimately decided not to include it. However, Venkatesh et al.'s (2003) research was in an organizational setting and as argued by Davis (1989), people in an organization may be forced to use a technology because it has a performance benefit even though they do not like using it. A large number of studies have shown that attitude is important in both a consumer and professional context. Lin, Chan and Jin (2004) for example conclude that attitude becomes a significant factor in a non-work environment at the expense of performance expectancy. The importance of attitude was shown even in a work-related setting by Dadayan and Ferro (2005) and Chau and Hu (2002). Schaper and Pervan (2004) included attitude in their UTAUT model for explaining technology use by occupational therapists, assuming a relation between attitude and intention. Results of a study by Welmers (2005) support the addition of the attitude construct in a consumer setting as well. Karahanna, Straub and Chervany (1999) showed that over time attitude becomes increasingly important in determining technology use.

A diversity of sources such as Davis (1989), Dadalayan and Ferro (2005), Järveläinen (2004), and Welmers (2005) show that attitude has a direct effect on intentions, and is influenced by performance expectancy and effort expectancy (or related concepts). Because of the wide

acceptance of attitude as an important factor in technology use, attitude was included and modeled as described above.

Self-efficacy and anxiety are concepts found in technology usage theory regularly. Venkatesh et al. (2003) say these are determinants of effort expectancy and have no direct influence on intention or use. Additionally, self-efficacy and anxiety are expected to be a minor issue for the use of an online newspaper and were not included in the research model.

Task-technology fit (Goodhue, 1995) and task-media fit (Daft & Lengel, 1986) are other concepts often found in usage models. Dishaw and Strong (1999) joined a task-technology fit model with the Technology Acceptance Model and found a substantial increase in explanatory power of the resulting model. Venkatesh et al. (2003) already included some measures of fit for the concepts performance expectancy and facilitating conditions. Combining fit models with UTAUT model was considered outside of the scope of this study.

Habit is brought forth by Venkatesh et al. (2003) as a direction for future research, along with behavioural expectations. As they argue, behavioural expectations will shed light on early stages of behaviour. Because usage for most participants is likely not in the early stages in this study, behavioural expectations are not considered here. IT adoption and usage models generally do not include habit. Even when habit receives attention, it is often mistaken for experience or for past usage, even though past behaviour does not necessarily imply a habit (Limayem, Hirt & Cheung, 2003; Polites, 2005).

The difference between experience, past behaviour and habit should be noted. Experience and past behaviour must be seen as a precondition for habit (Limayem, Hirt & Cheung, 2003). To have a clear distinction between the concepts, an adaptation of Limayem et al.'s (2003) definition of habit is used: "The extent to which using the online newspaper has become automatic in response to certain situations".

The idea that habitual use of an other medium can negatively affect (intentions of) usage has received even less attention (Polites, 2005). Polites (2005), following Ouelette and Wood (1998), modeled counterintentional habit in the TAM model as having a direct impact on intent and usage. This way of modeling the habit concepts is followed for the present research model. As noted by Polites (2005) there are possibly relations to other concepts of the model. An effect that might surface for instance is that habit also has an effect on the relation between intent and usage (Limayem et al., 2001).

In an extensive review of past research on habits, Ouelette and Wood (1998) concluded that a deliberative reasoning process guides action when habits are unlikely to form or are not yet established, while habits are formed in stable situations with routine responses. In this way, habits and intentions predict action together. Intention is defined in a strictly deliberate way in this study, in order to have a clear separation from the automaticity of behaviour measured by habit. This leaves out operationalizations such as “I am going to use the online newspaper” and “I predict I will use the online newspaper”. These do not solely measure intention as participants may be aware that they are going to use the newspaper due to a developed habit.

Finally, as in Lin, Chan and Jin’s (2004) research, the use of the technology is highly voluntary and consequently voluntariness does not warrant inclusion.

Method

Questionnaire development

The questionnaire items resembled Venkatesh et al.’s (2003) questionnaire design as much as possible as it was the result of large-scale statistical analysis and validation. However, to fit the context of voluntarily using an online newspaper, alterations were necessary. Whenever an item used by Venkatesh et al. (2003) was not usable in this research’s setting, a next high loading item of their questionnaire was considered. All questionnaire items except for intention to use were formulated in present tense, because online papers are already widely in use (d’Haenens et al., 2004) and participants already knew the newspaper (the ones that did not were filtered out, as can be read in the next section).

For the operationalization of counterintentional habit, print newspapers were considered the alternative to and a substitute for the online newspaper. This choice was made because most research concerning newspapers seems to concern a cannibalization relation between online and print newspapers (Boczkowski, 2002), because many consumers read a print newspaper habitually (Bentley, 2000), and to narrow the scope of the research.

Most questionnaire items were assessed using 5-point Likert scales. The available options were: strongly disagree, disagree, do not disagree/do not agree, agree, strongly agree. Additionally, every question had an “I do not know/not applicable” option. Two Likert-scale questions were reverse-coded. There was one open question on the amount of minutes spent at the online newspaper during a regular visit. Questions on the frequency of use and the amount of experience had ordinal scales with increasingly large intervals between possible answers. After

initial construction of the questionnaire, it was pre-tested using a small sample in May 2006. For the actual survey a regional newspaper agreed to participate by making the online version of their newspaper the subject. Before the questionnaire was placed online, it was reviewed by experts. Based on the feedback, some questions were modified or removed. The questionnaire items for all of the concepts of the research model can be found in Appendix A. Appendix B contains the Dutch versions of the questionnaire items. The concepts that are operationalized differently from Venkatesh et al.'s (2003) research, are discussed below.

Snook (2005) found a gap in assessments of social influence in technology acceptance models. As he describes, while social influence has consistently been deemed important in behavioural research, it has had little effect on predictive strength. He argues that this may be an effect of the operationalization of social influence as perceptions of other people's attitudes. In his dissertation he adds elements of Bandura's Social Cognitive Theory (Bandura, 1986) to his scale for assessing social influence. Snook (2005) theorized three determinants of social influence: perceived social norm, motivation to comply (the tendency to follow advice and obey), and observed use (observed behaviour of people who are important to the participant). Of these, perceived social norm and observed use proved to be significant determinants in Snook's (2005) study. Social norm was already present in the original UTAUT questionnaire, but two of Snook's (2005) highest-loading questions for observed use were included to measure social influence.

During pre-testing of the questionnaire items it became obvious that the questions for facilitating conditions that were adapted from Venkatesh et al.'s (2003) questionnaire were not consistently answered and were not valid for the setting of online newspapers. Apparently, resources such as time and knowledge were no real constraints for using the online newspaper and questions regarding software or managerial support were not relevant. Although the questions on time and knowledge resources were taken into the final questionnaire, the concept of facilitating conditions was primarily operationalized with questions concerning technical facilitation.

Limayem et al. (2003) developed a measurement scale for assessing habit, of which four of the highest-loading items will be used in this article. Straightforward adaptations of these items were used to measure counterintentional habit. Hubona & Kennick (1996) found that use behaviour can be divided into use frequency and use volume. Lu et al. (2003) stated that often

surveys asking about use behaviour do not capture this fully. Hence, questions pertaining to frequency and volume of use of the online newspaper were included.

The first question on frequency was measured on an ordinal scale, while the second question was open. Using the duration of a visit and the frequency of visiting, it is possible to attribute more use behaviour to people for whom the product of frequency multiplied by duration is higher. In other words, a volume per time measure was sought after that was expected to paint a clearer picture of behaviour than a frequency per time measure alone.

Schwarz, Hippler, Deutsch and Strack (1985) have shown that having a scale for behavioural frequency answers can frame and bias answers. They ascribe his effect largely to the fact that respondents are unwilling to choose the extreme categories because they represent “unusual” answers. It is felt that the categories presented in the final survey are not that intimidating; the highest two frequencies (of seven) on the final survey were chosen by 16% of the respondents. Framing might also work in a positive way as respondents can recognize answer categories that they think are valid.

A bigger issue is the reported low accuracy of self-reported behaviour frequency (Burton & Blair, 1991; Straub, Limayem & Karahanna-Evaristo, 1995). There was no way around this in the current research though luckily the amount of behaviour was not of interest for this study, while covariances with the amount of behaviour were. It is expected that the inaccuracy of behaviour reporting is somewhat equally spread out over the different reported behaviours resulting in meaningful covariances. Menon, Raghuram and Schwarz (1995) have shown that behavioural reporting by respondents is still pretty reliable for regular behaviours, which is reassuring in this research’s context.

Sample

An invitation for the final questionnaire was sent to 2314 people in August 2006. Participants were made aware that the subject of the questionnaire was the news section of the online newspaper, as the website offered an online community as well. After two weeks the survey closed with 990 returned questionnaires, resulting in a response rate of 39%, which is an adequate percentage especially considering the questionnaire was sent out in the middle of the Dutch summer vacation. Of these 990 returned questionnaires, 723 were used. The other 260 questionnaires were either only partially completed or cases where the participant had no knowledge of the online newspaper in question. There were more male respondents (450, or

62.2%) than female (273, or 37.8%). The distribution of ages across participants is visible in Table 2, and the amount of experience participants had with online newspapers is visible in Table 3. As can be seen most participants were spread pretty evenly across ages 25-65 while younger and older respondents were slightly underrepresented. More than 90% of the participants had more than a year's worth of experience with online newspapers. It should be noted that this distribution for experience with online newspapers is biased as participants were required to have knowledge of the online newspaper under investigation.

Table 2. *Age distribution.*

Age	Frequency	Percentage
<25	44	6.1
25-34	142	19.6
34-44	180	24.9
45-54	197	27.2
55-64	122	16.9
65 or more	38	5.3
<i>Total</i>	723	100

Table 3. *Experience with online news.*

Time	Frequency	Percentage
Less than 1 month	15	2.1
Between a month and 6 months	51	7.1
Between 6 months and a year	174	24.1
Between a year and two years	179	24.8
Between 2 years and 3 years	123	17.0
Between 3 years and 5 years	118	16.3
Longer than 5 years	63	8.7
<i>Total</i>	723	100

Data analysis

For most of the 5-point Likert scale questions, the “I don’t know/not applicable” option was considered a synonym for “Don’t agree/Don’t disagree” (equaling the value of 3 on the Likert scale) and recoded as such. Exceptions are listed below. The percentage of participants that chose the “I don’t know/not applicable” option was low for most items, but very high for the questions on social influence, ranging from 9.1% to 21.4%. It is felt that the decision to equal “I don’t know/not applicable” to the neutral Likert option was a sound one; for example, for the item “People I respect, think I should use the online newspaper”, 21.4% of participants answered “I don’t know/not applicable”. It can be imagined that participants found it more logical to answer “I don’t know” to that statement than to say “I don’t agree and don’t disagree”, as it is more a matter of knowledge than opinion. There are many other studies that use “don’t know” as the

middle value in a Likert scale, for instance Moon & Balsubramanian (2001), Salanterä (1999), Denton, Doran & McKinney (2002) and Bauer & Petkova (2000).

For the items “How long have you read the online newspaper or other online newspapers?” and “How often do you visit the online newspaper?” the “I don’t know/not applicable” option was recoded as a missing value, because no neutral option existed for those questions. After this recoding step, there were three variables with missing values. Roth, Switzer III & Switzer (1999) state that to handle missing values, imputation techniques are preferred over list-wise deletion, as list-wise deletion deletes large portions of real data and increases sampling error. They advise person-mean imputation over item-mean imputation, because individual differences and covariances are reduced by item-mean imputation.

The reduction in reliability for item-mean imputation is offset by an inflation of reliability when person-mean imputation is used (Downey & King, 1998; Curan, Molenberghs, Fayers & Machin, 1998). As there were no other items measuring the same concept for the three variables that had missing values, either item-mean or item-median imputation was used. Raymond and Roberts (1987) stated that missing data in a random pattern are better suited for imputation techniques. It is believed that the large sample size of 723 ensures that any important intra- and inter-scale covariances will be found and that the distribution of missing values was random.

Missing values for the items “How long have you read the online newspaper or other online newspapers?” and “How often do you visit the online newspaper?” were handled by median imputation. Median imputation was used because it is less susceptible to outlier distortion than mean imputation but primarily because the used scale was ordinal (Acuna & Rodriguez, 2004).

The item “How often do you visit the online newspaper?” had a low percentage of missing values (1.7%) but the percentage was high for the question “How long have you read the online newspaper or other newspapers?”: 9.1%. Acuna and Rodriguez (2004) indicate that for percentages of missing values from 5%-15%, sophisticated replacement techniques have to be used. These techniques were outside of the scope of the current research. After the conversion above, there was one variable with two missing values left: “How much time do you spend at the online newspaper on a regular visit?”. These missing values were handled by mean imputation because the question had a continuous scale.

Most respondents answered to spend 5 (21%), 10 (31%) or 15 (19%) minutes at the website per visit or an amount very close to 5, 10 or 15. An average use duration of more than 15 minutes

was reported by 7.5% of the respondents. The construction of a single use measure out of the use frequency and use duration measures posed a problem. From a psychometric viewpoint multiplying an ordinal scale with any other scale is a tricky affair, though it can be argued that ultimately meaningfulness is more important than arguments based on the scale of variables (Velleman & Wilkinson, 1993; Knapp, 1990). It was chosen to define use behaviour by frequency of use alone. This decision was supported by a simple cross tabulation. It showed that the distribution of people answering 5, 10 or 15 minutes was roughly equal for each category of frequency of use. Arguably, the nature of visiting a news website implies that people differentiate primarily on frequency with relatively little spread in the amounts of time spent at the site.

After preparation of the data set, actual data analysis began. First the internal consistency reliabilities of the items underlying the theoretical constructs of the hypothesized framework were tested with Cronbach's Alpha coefficient, which is recommended to be at least 0.7 (Nunnally & Bernstein, 1994).

Further analysis consisted of Structural Equation Modeling (SEM) with maximum likelihood estimation. SEM is a relatively new technique that is well-suited for testing models that have already been validated, or for testing models which have strong theoretical grounds. It is often used in social sciences for cross-sectional research designs such as the one used in this paper. In other words, SEM is very useful as a confirmatory technique, with strong mathematical and statistical grounds (MacCallum & Austin, 2000; Chin, 1998).

Because the concepts tested in this research all flow from prior research, and the UTAUT model serves as a base model, this research is considered primarily confirmatory and SEM is a logical choice. However, although the research is governed by a confirmatory principle, there is no doubt that it is in part exploratory as well. Scale development was needed for the context of online newspapers and for translation to Dutch, and improvements of the hypothesized model were necessary. These improvements will be discussed in detail in the results section. As Tuckey argues, confirmatory and exploratory cannot be completely one or the other (Tuckey, 1980). A statement supported by Jöreskog (1974) who said that many investigations are to some extent both exploratory and confirmatory, because they involve variables of known and unknown composition.

The covariance matrix which served as input for all conducted analyses can be found in Appendix C. Concepts from the hypothesized model were modeled as latent variables, while their

corresponding questionnaire items were modeled as measured variables. The maximum likelihood approach that was taken, assumes interval data. For most concepts in this study, items had ordinal Likert scales. After a literature study on this topic Jaccard and Wan (1996) remarked that somewhat severe deviations from intervalness do not seem to affect Type I and Type II errors dramatically.

Software

All general data recoding and analysis was done using SPSS 13.0 for Windows. Structural Equation Modeling was accomplished through using Amos 5, Build 5138.

Results

Abbreviations that can be found in Table 1, are used throughout this section where needed to be able to more succinctly describe the results. The results of a preliminary Cronbach's alpha analysis can be found in Table 4. Based on the results, facilitating conditions were divided into four questions concerning technical conditions and three other questions. The four questions concerning technical conditions had a Cronbach's alpha score of .727, while the three other questions had an alpha of .428. The latter were dropped from further analysis as they had already shown difficulty in pre-testing, and FC was defined by the four technical questions (raising its alpha from .687 to .727). Intention and use were measured with a single item. The other alpha scores were considered adequate and SEM analysis began.

Table 4. *Cronbach's alpha after final questionnaire.*

Concept (number of items)	Cronbach's alpha
PE (6)	.839
EE (5)	.800
SI (5)	.807
FC (7)	.687
ATT (2)	.907
H (4)	.793
CH (4)	.914

Before checking any structural model, the measurement model was tested as recommended by Anderson and Gerbing (1988), and Kline (1998). This prevents misrepresentation of the structural models due to measurement misspecification. All concepts (latent variables) and their indicator variables with error terms were modeled as well as correlations between all of the latent variables. Although a stepwise assessment (one change at a time) of the measurement model was conducted, for the sake of brevity the fit indexes at the start of analysis of the measurement

model, the changes, and the fit indexes at the end of the analysis of the measurement model will be given.

Because maximum likelihood estimation makes the assumption of normality, a test of normality was conducted before starting SEM analysis. The results can be found in Appendix D. Univariate skewness and kurtosis for most variables were within the range of -1.5 to +1.5. This range is suggested as acceptable by Muthén and Kaplan (1985). Curran, West and Finch (1996) found that significant problems arose when most variables approached levels of around 2.0 for skewness and 7.0 for kurtosis. Most variables in this study are well below those bounds. However, multivariate kurtosis was high. This is for a large part explained by the use of ordinal scales (Andreassen, Lorentzen & Olsson, 2006), and because real data are seldom normally distributed (Micceri, 1989).

Deletion of the largest outliers based on Mahalanobis d-squared yielded only a small improvement of multivariate normality and it was decided to leave the dataset intact, to retain as much real data as possible. After an analysis of different ways of model building with non-normal data, Andreassen et al. (2006) advised to use SEM. As argued by Keller (1998), even though the indicator variables do not have a normal multivariate distribution, use of SEM should capture most of the important variance.

Notational conventions for the SEM models following below are: circles/ovals represent latent variables (theoretical concepts), dashed single-headed lines represent nonsignificant regressions, numbers written next to the regressions are their standardized regression weights and double-headed arrows are covariances/correlations. Dashed double-headed arrows are nonsignificant covariances, and the numbers listed near the covariance/correlation lines are correlations. For reasons of clarity and space saving, the indicator variables for the concepts as well as the error terms for endogenous variables in the models listed below will not be shown. All diagrams can be reconstructed with the covariance matrix supplied in Appendix C and the steps followed in this section.

The models listed below have regressions for error terms of indicator variables and for error terms of endogenous latent variables set to 1. Regressions of each first indicator variable to its latent variable was set to 1 for scaling purposes, and variances of the error terms of the indicators of intention and use behaviour were set to 0 because there was only one indicator available. Other than these standard-practice settings, no regression weights or variances were fixed.

Every diagram has several fit indexes listed plus the percentage of explained variance of INT and USE. The fit indexes that were chosen were SRMR (Standardized Root Mean Square Residual), RMSEA (Root Mean Square Error of Approximation), TLI (Tucker-Lewis Index, also known as NNFI: Non-Normed Fit Index) and CFI (Comparative Fit Index). TLI and CFI are indications of how close the specified model is to a fully specified model and appear to be consistent with different sample sizes (McDonald & Marsh, 1990; Bentler & Bonnet, 1980). Hu and Bentler (1998) recommended use of the SRMR, TLI and RMSEA indexes, among other indexes. Beauducel and Wittmann (2005) state that SRMR and RMSEA give good estimations when models are misspecified, while MacCallum and Austin (2000) encourage the use of RMSEA because it is adequately sensitive to model misspecification, yields valid judgments of the quality of the model when interpreted by common norms and most importantly because there is a confidence interval available for RMSEA. Additionally, because the distribution of the fit index is known, statistical power for the RMSEA fit index can be determined (MacCallum, Browne & Sugawara, 1996). The significance level for causalities and correlations was set at $p < 0.05$.

This article will follow the recommended cutoff values Hu and Bentler (1999) proposed after they analyzed correctly and incorrectly rejected or accepted models at different cutoff criteria. The cutoff values recommended by them, and used as a guideline in this research, were: close to 0.95 for CFI and TLI, close to 0.6 for RMSEA and close to 0.8 for SRMR. These values were not treated as set in stone. Marsh, Hau and Wen (2004) argued, in an article discussing the findings by Hu and Bentler, that the cutoff values proposed by Hu and Bentler are too stringent in practice and should not be used as “golden rules”. In the end, the responsibility for judging adequacy of the model is rested on the researcher’s shoulders, not on statistics.

The simplest structural model analyzed below had 149 degrees of freedom. As mentioned, sample size was 723. MacCallum et al. (1996) showed how to determine statistical power for conclusions based on RMSEA fit. The calculations they provided, show that statistical power for RMSEA fit is essentially 1 for models with 100 degrees of freedom and a sample size of 500. They also state that power increases with degrees of freedom and with sample size. Logically then, this shows that for all the models that follow below, power for the RMSEA fit index is 1.

This does not necessarily apply to the other fit indexes, but considering the power score for RMSEA and the amount of degrees of freedom combined with the sample size, there is no reason

to believe statistical power will not also be very high for the other fit indexes. Testing for moderation by age, gender and experience was done at the end of the modeling process when a well-fitting model was found. A motivation for doing this at the final stage of modeling can be found at the end of the results section.

SRMR, RMSEA, TLI and CFI for the base measurement model were 0.0578, 0.067, 0.866 and 0.883 respectively. This indicated that the measurement model needed tweaking, as expected because it was the first large-scale application of the developed questionnaire. To improve the measurement model, patterns in the modification indexes were analyzed and items that indicated a potential problem were assessed on the basis of face validity and theoretical considerations. In total 5 items were removed from the measurement model. The items “I think the online newspaper is useful” and “It is useful to use the online newspaper” had several links to other concepts. The two questions were very broad, while the rest of the questions for performance expectancy were more concrete. Additionally usefulness was considered an unclear concept in the context of this study (what exactly is the usefulness of reading an online newspaper?). Consequently the two questions were dropped.

The item “Using the online newspaper feels natural” showed to be related to attitude as well as to habit, which seems to hold face validity as a natural feel can be considered an attitude on the online newspaper. As the item was poorly discriminant between attitude and habit, it was removed. Another item used for habit, “When I want to read the news, the online newspaper is an obvious choice for me” showed relations with (indicators of) other concepts. In Limayem et al.’s (2003) study this item showed to be the least discriminant of their selected items. In their research it still had a high loading on habit, but they had far fewer concepts to deal with. Because of the lack of discriminant power of this item, it was removed. The removal of the above two items for habit posed an interesting problem for the items measuring counterintentional habit, as they were worded in the same fashion. Because there were no concepts in the measurement model with which the items of counterintentional habit could have discriminatory problems, they were left intact.

The item “I use the online newspaper because a large portion of the people around me uses it” showed ties to several other items of social influence, and other concepts. This was determined to indicate that it was worded too vaguely when compared to the other items measuring social influence. Additionally, it was thought to be too related to internal beliefs and motivations to use

the online newspaper, rather than measuring external social influence. The intended meaning of the item was captured fully in the items that were left. Hence, the item was deleted as well.

After these modifications to the measurement model, the fit scores for SRMR, RMSEA, TLI and CFI were 0.0457, 0.054, 0.922, and 0.935. The 90% confidence interval for RMSEA was 0.050-0.058. The measurement model was considered adequate for testing the structural models, as other modifications were thought to be unwarranted. No correlations between error terms of any of the indicator variables were modeled. As such the indicator variables can be left out of the models following below without information loss. The final set of indicator variables used, with corresponding questions, is displayed in Appendix E.

Testing the original UTAUT model and the hypothesized model

Causality. According to MacCallum (2000) two positions can be taken on causality in cross-sectional studies such as these. The first is that a causality is immediate, the second is that the causal variable is stable. A problem area in cross-sectional surveys such as the one in this study is the causal relation between intention and use behaviour. Intention has been operationalized in this study as the intent to use the newspaper in the forthcoming month, while use behaviour has been operationalized as regular average use. On the surface, a causal link between these two seems illogical. The causality between the two is modeled, following this reasoning:

(1) The causal relationship in question is between the concepts, not between their operationalizations. As long as the operationalizations reflect the latent variables, any reasoning about the causality should be concerning the latent variables.

(2) Next, if intention is assumed to be stable, it can be used to model a causal relation to use behaviour. The issue then is the temporal stability of intention, which has already shown to be a moderator of the intention-behaviour relationship (Sheeran, Orbell & Trafimow, 1999; Sheeran & Abraham, 2003). However, intentions for the behaviours in question (studying and exercising) in those articles can be argued to fluctuate more than regular consumption behaviour such as reading a newspaper. It is assumed that intention in the current study is subject to some fluctuation but is for a large part stable.

Testing the hypothesized model. The first model to be specified was the original UTAUT model. As can be seen in Figure 2, the goodness of fit indexes hovered around 80% (CFI=0.808, TLI=0.780). SRMR and RMSEA also indicated that fit could not be considered good, being 0.1656 and 0.09 respectively. All the significant relations were congruent with hypotheses on

positivity and negativity. Explained variances for INT and USE were relatively high at 30.1% and 28.2%.

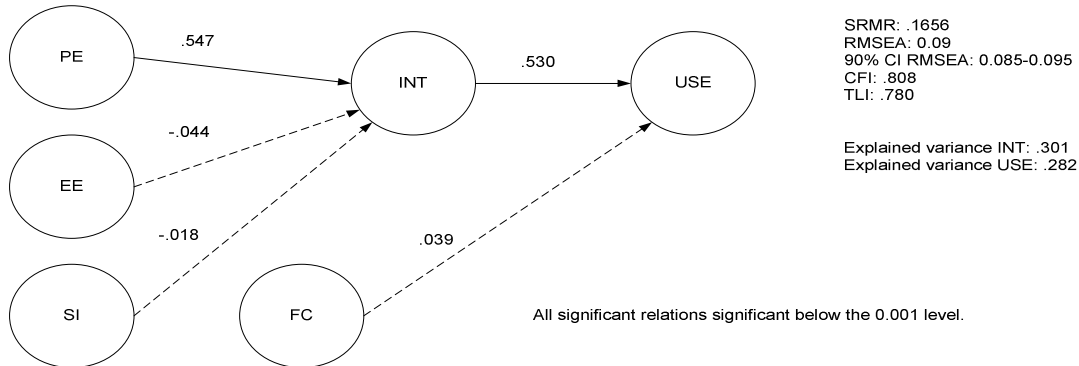


Figure 2. Original UTAUT.

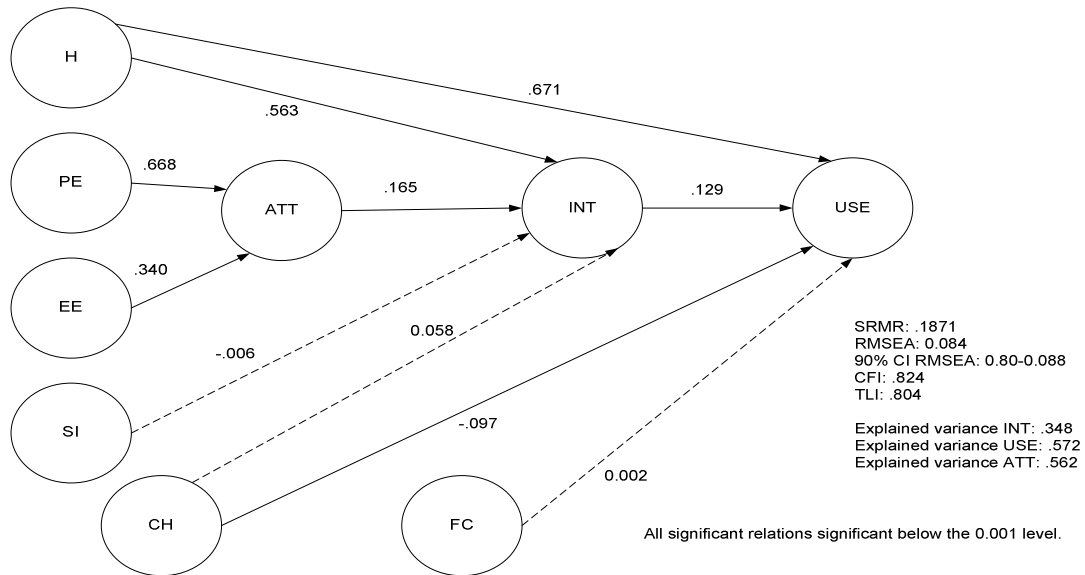


Figure 3. Hypothesized model.

After specification of the original UTAUT model, the hypothesized model was tested. The results can be seen in Figure 3. All fit indexes showed improved scores (TLI=0.804, CFI=0.824, SRMR=0.1871 and RMSEA=0.084) over the original UTAUT model, and explained variance in INT and USE was higher (34.8% and 57.2% respectively). All of the significant relations were either positive or negative in line with the hypotheses. Because fit scores of these structural models were relatively low, no conclusions based on the results so far are drawn. The low fit scores are possibly due to the large sample size, which increases the chances of rejecting a model due to minor misspecification (Suyapa, Silvia & MacCallum, 1988). Though at this stage it was uncertain why goodness of fit was low, it was expected that habit would have more relations to

the other latent variables than those stated in the hypothesized model. A specification search (Long, 1983) to find a model that fixes errors in specification was started.

For most researchers using models this is a familiar situation (Chin, 1998; Kaplan, 1988; Anderson & Gerbing, 1988). Suyapa et al. (1988) stated some recommendations for a specification search, which were followed as much as possible. The main point of their recommendations is that, logically, all changes should be guided by theoretical consideration rather than relying upon modification indexes, a notion also brought forth by Kaplan (1988) and Chin (1998). Capitalization on chance (MacCallum and Austin, 2000; Chin, 1998) is believed to be minimized by following these recommendations.

Specification search

A structured approach of analyzing submodels was followed. First the original UTAUT model was adjusted to reflect the changes in operationalization that were made in this study. The resulting model is called *Adjusted UTAUT*. The addition of attitude to the Adjusted UTAUT model was looked at next. This model is called *AttitudeUTAUT*. After that, the addition of habit and counterintentional habit to the Adjusted UTAUT was scrutinized. The resulting model is called *HabitUTAUT*. Finally, the AttitudeUTAUT and HabitUTAUT models were integrated, leading to the *Integrated Model*.

Adjusted UTAUT. Five of six constructs of the original UTAUT model were considered to reflect their intended meaning. However, facilitating conditions were operationalized in a different fashion, as technical constraints. Igarria, Guimareas and Gordon (1995) found that systems quality (which resembles facilitating conditions as it is operationalized in this study) affects PE and EE, instead of USE. This also holds face validity as poor technical circumstances for instance can slow down the rate of information-gathering on the website (lessening its usefulness) and enlarge the effort needed to find information (for instance if the page is displayed incorrectly). The influence of technical circumstances on PE and EE was also found in Venkatesh et al.'s (2003) original studies, in Carlsson, Carlsson, Hyvönen, Puhakainen & Walden (2006), Rai, Lang & Welker (2002) and indirectly in Cody-Allen & Kishore (2006). Because of this, FC were linked to PE and EE, and the link with USE was removed. The resulting model can be seen in Figure 4. Fit scores showed a considerable improvement of fit over the original UTAUT model with SRMR=0.1054, RMSEA=0.075, CFI=0.869 and TLI=0.849. Explained variance of INT increased slightly over the original UTAUT model.

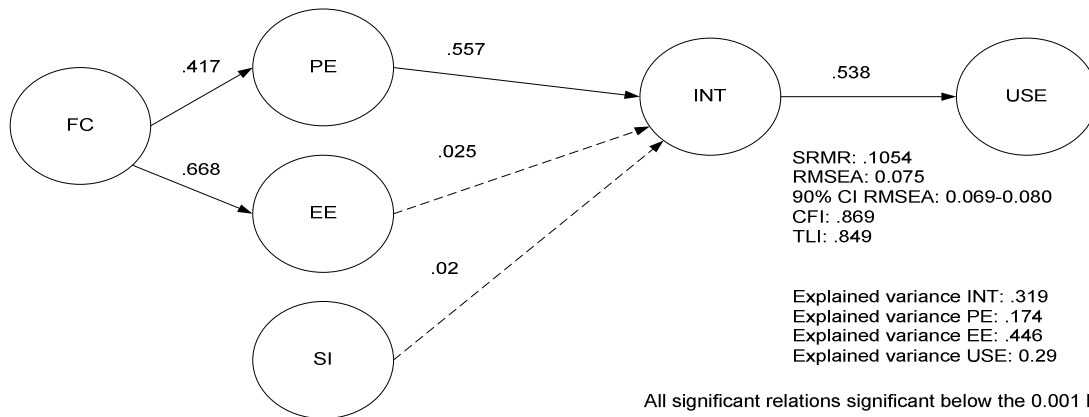


Figure 4. Adjusted UTAUT.

AttitudeUTAUT. Although attitude was modeled as a complete mediator in the hypothesized model, there is a large body of literature that leads to questioning of this fully mediating role. Examples are: Davis (1989), van der Heijden (2003), Carlsson et al. (2006), Ramayah, Lam & Sarkawi (2003) and Davis, Bagozzi & Warshaw (1998). The first and second study listed were also in a web setting. Because of this, when ATT was added to the Adjusted UTAUT model, relations from PE and EE to INT were kept intact. If ATT would have a full mediating role, the direct effects of PE and EE on I would have to be marginal when they were connected to ATT and ATT was connected to INT. However, the model resulted as depicted in Figure 5.

Although model fit (SRMR=0.1088, RMSEA=0.072, CFI=0.884, TLI=0.866) improved over the Adjusted UTAUT, ATT did *not* have any significant effect on INT once ATT was considered only a partial mediator. The size of effects of PE and EE on ATT was consistent with other empirical research such as Hubona & Geitz (1997) and Knutsen (2005).

HabitUTAUT. Adding habit and counterintentional habit to the Adjusted UTAUT was the most complex part of the specification search. It consisted of three steps: first habit and counterintentional habit and their hypothesized relations were added to the Adjusted UTAUT. Next, possible effects of habit on other latent variables were considered. At the final step, possible effects of other latent variables on habit were considered.

In the first step a correlation between H and CH was modeled. This was done because having the habit of reading the online newspaper and having the habit of reading a print newspaper are likely to have at least some negative effect on each other. The result of this step in the modeling of H and CH can be found in Figure 6.

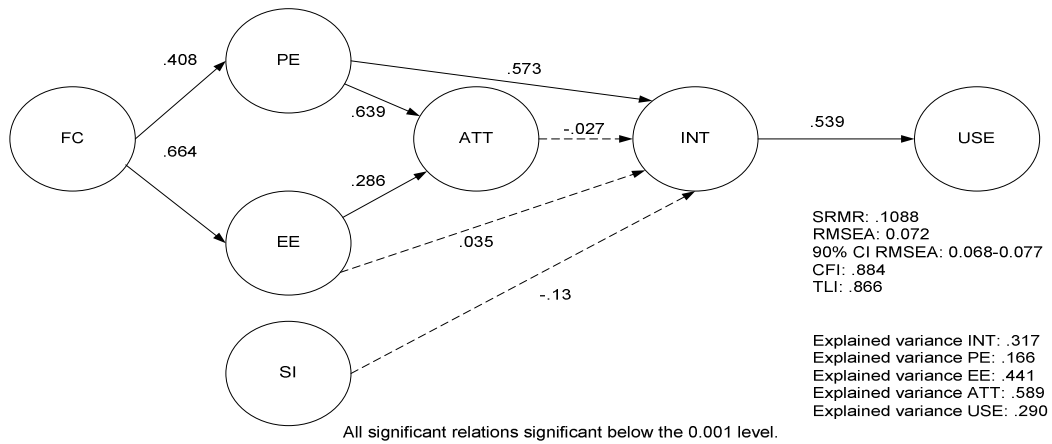


Figure 5. AttitudeUTAUT.

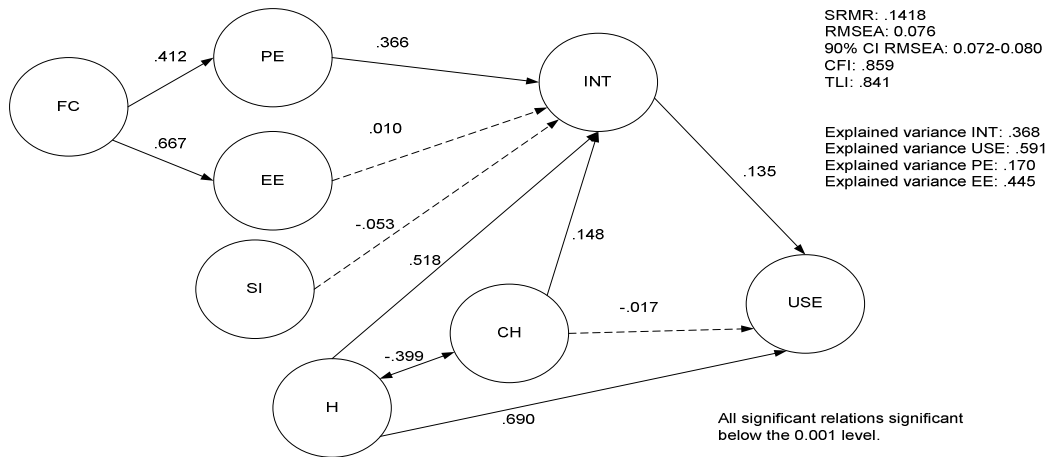


Figure 6. HabitUTAUT - step 1.

Fit indexes (SRMR=0.1418, RMSEA=0.076, CFI=0.859 and TLI=0.841) showed slightly worse fit than the Adjusted UTAUT and AttitudeUTAUT models; however, not by much. Explained variances in INT and USE increased by roughly 5% and 30%. H showed a large influence on USE.

Next, possible effects of H on other latent variables were considered. Modeling an influence of H on external influences such as SI or FC seemed too far-fetched and was not supported by literature. However, a causal relation from H to the belief constructs (PE and EE) was considered appropriate. Two lines of reasoning are possible:

(1) As Hodgson (2003) argues, habits are foundational to thoughts and behaviour and all deliberations are based on rules and habits. Applying this to the current context, it is plausible that people who have a habit of using the online newspaper have a disposition to have more positive beliefs about it and thus score higher on PE and EE. In other words, habit reinforces

beliefs on performance and ease of use. A study by Limayem, Khalifa and Chin (1999) supports this line of reasoning: in their findings habit has an enforcing effect on attitude. Although in a different context, Verplanken, Aarts and Knippenberg (1998) showed that habit attenuates choice processes.

(2) Past behaviour has been shown to have a positive influence on performance expectancy and effort expectancy (Igarria et al., 1995). Intuitively, this makes sense because as people use the application more, they learn to use it more effectively (PE) and efficiently (EE). Habit is highly connected to past behaviour; as mentioned before it has often been measured as past behaviour (Verplanken et al., 1998) Although the conceptualization of habit as past behaviour is not used in this paper, habit does *imply* past usage. Even though not all people with higher habit necessarily have more past behaviour than people with lower habit, it is highly likely that in general higher habit is tied to more past behaviour and as a result leads to higher ratings for PE and EE in this way.

The first viewpoint is considered more in line with the conceptualization of habit chosen in this study. Based on empirical support however, the second is more probable. The HabitUTAUT model with added relations from H to PE and EE can be seen in Figure 7. With the adjustments made in step 2, fit increased by a large amount (SRMR=0.1038, RMSEA=0.065, CFI=0.898 and TLI=0.884). Explained variance of INT increased by 6% as well. The final step for the integration of H into the Adjusted UTAUT model was considering which latent variables could have an influence on it.

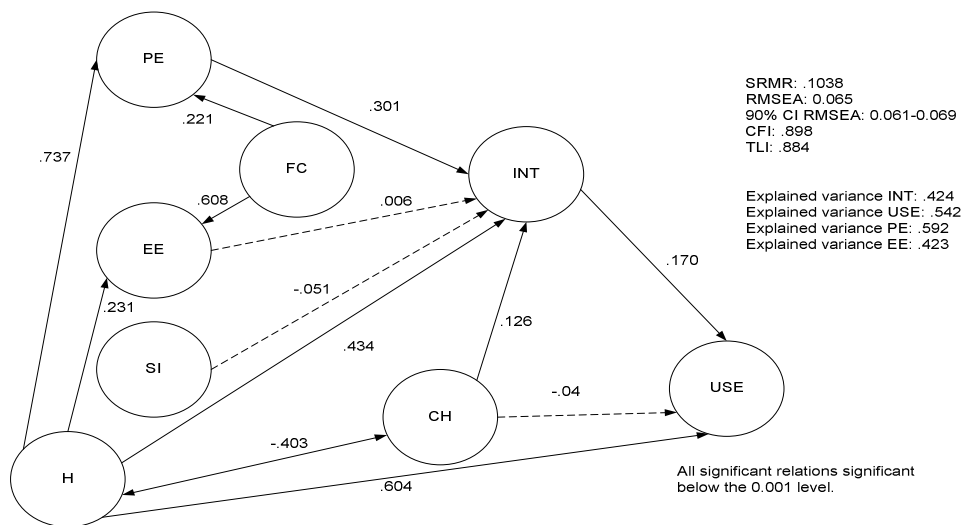


Figure 7. HabitUTAUT - step 2.

Pollak (1976) already theorized the effect of social influences on habits in 1976, and Binder and Pesaran (1998) explicitly conclude that social interactions, when combined with habit formation, can significantly strengthen habit formation. There is also a vast body of work concerning detrimental health behaviours and social learning (such as its influence on development of smoking habits (Krohn, Skinner, Massey & Akers, 1985)). Although the effects may be less severe in the current context, there is no reason not to expect similar ties for technology use and a relation from SI to Habit was added.

Figure 8 shows the resulting HabitUTAUT model. Fit indexes increased again and explained variance in INT and USE increased as well (SRMR=0.720, RMSEA=0.060, CFI=0.914, TLI=0.902). The relation from SI to H caused a curious result. SI and INT had a nonsignificant relation in all the previous models, but it became significantly negative now. After realizing that the new operationalization of SI may have an unexpected effect, social influence was split into two different, but correlated, concepts: social norms (SN) and social context (SC). The first entails other people’s opinions while the latter means observed peer use. The effects of social context are not necessarily due to social modeling. Peer behaviour may have an influence simply through side-effects. For instance, on a shared family computer somebody might bookmark the online newspaper, which could lead another family member to visit the online newspaper more quickly.

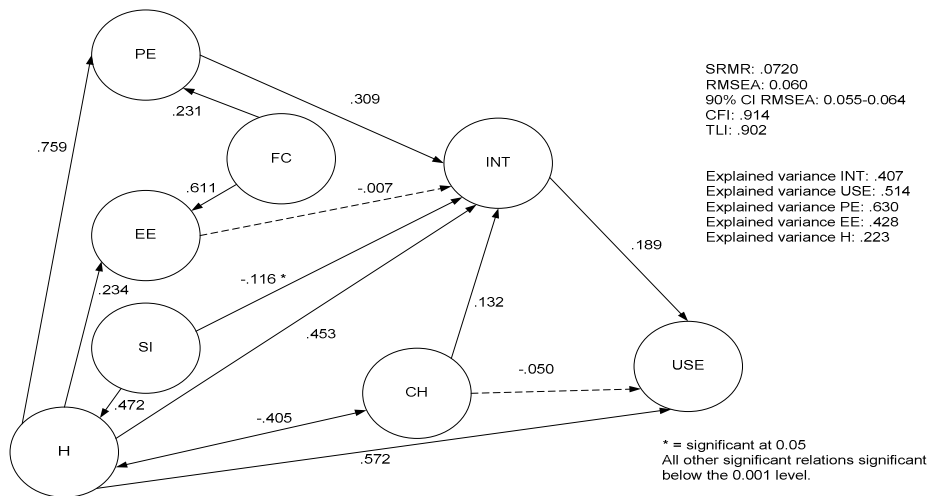


Figure 8. HabitUTAUT - step 3.

The split of SI led to the model in Figure 9. It proved useful; the model was now interpretable again. Although SN and SC were highly correlated (which is why they loaded well under one concept in the first place), only SC had a reinforcing effect on H. Model fit improved as well,

while standardized regression weights for relations which did not involve SI remained virtually the same. Retro-actively applying the split to all previous models also showed an improvement of fit for all models while all regression weights remained virtually the same. Fit scores for the SI split model were SRMR=0.07, RMSEA=0.056, CFI=0.928 and TLI=0.917.

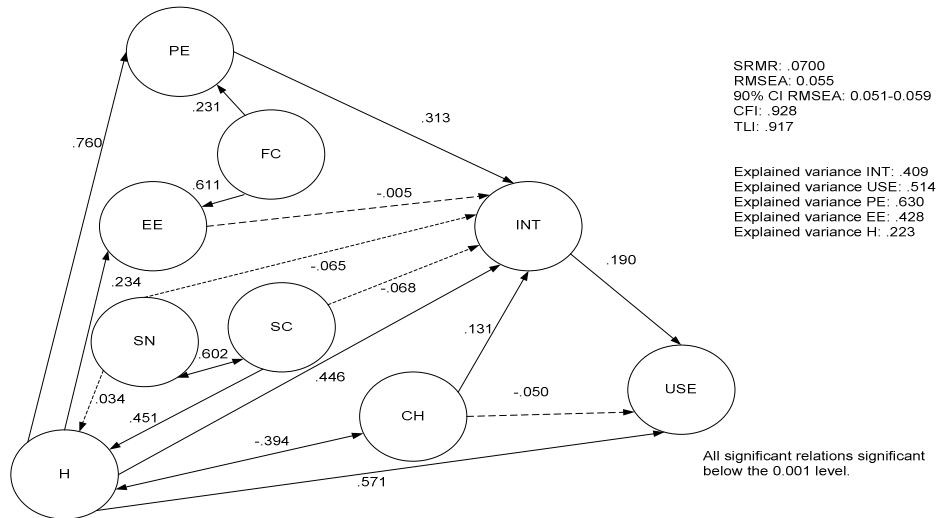


Figure 9. SI split.

Integration. Integration of the AttitudeUTAUT and HabitUTAUT models was straightforward and resulted in the model depicted in Figure 10. This was considered the final model. SRMR and RMSEA were better than cutoff values (being 0.0693 and 0.055 respectively). The entire confidence interval for RMSEA was also below the cutoff value for RMSEA. Fit indexes for TLI (0.918) and CFI (0.938) were relatively close to the cutoff of 0.95. The added relations for H to PE and EE, and for SC to H had signs that make sense. H showed a reinforcement effect on PE and EE, while SC reinforced H. FC (or technical conditions) acted as a pre-condition for PE and EE.

Of the hypothesized relations, contrary to expectations A and EE showed to have no significant effect on INT, and the effect of CH on USE was very small and only significant in the final model. Further, the effect CH on INT had a different sign than expected. The habit of reading a print paper led to higher intentions of using the online newspaper. Explained variances for INT and USE were high at 38% and 51%. The largest influence on both INT and USE was H, with standardized regression weights of 37.7% and 55.6% while the standardized regression weight of INT on USE was 20.2%. Variance left unexplained amounted to 62.3% for INT and 44.4% for USE. Fit values and explained variances of INT and USE were higher than those of the Adjusted UTAUT model.

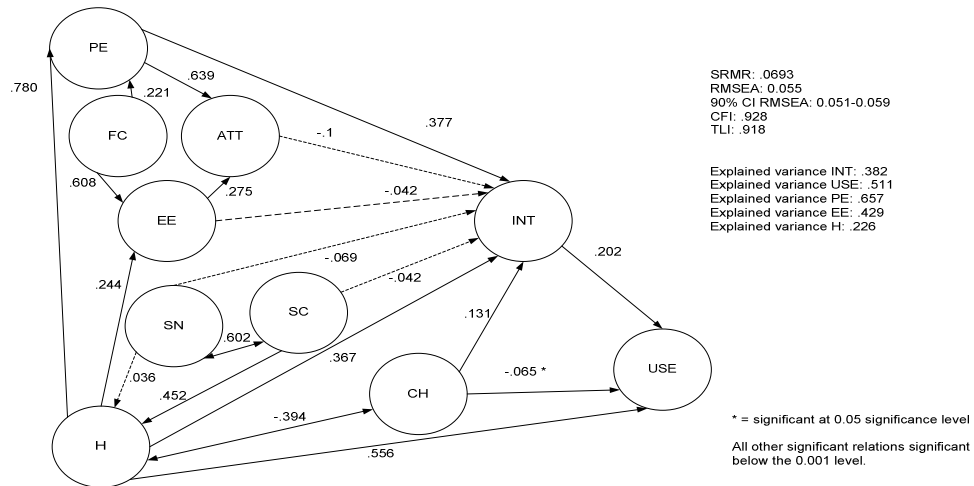


Figure 10. Integrated model.

Moderation

After an integrated model was found, tests for moderation by gender, experience and age were conducted. These tests were performed at the end of the modeling process because modeling moderation in Amos is not possible. Further, no relations were expected to completely reverse due to moderation and it was expected that any robust relationship between the latent variables would show even when moderated. Ping (1996) did develop a method for moderation testing that can be utilized using Amos, making use of the distinction between measurement model and structural model. Said method unfortunately requires a large amount of manual computation.

As Chin, Marcolin and Newsted (1996) indicate, testing of moderators with covariance-based techniques such as SEM is “tedious and technically demanding”. In practice it is hard to find the moderator effects even when sophisticated methods are used (McLelland & Judd, 1993; Jaccard, Wan & Turrisi, 1990) and when they are found, interpretation is difficult as even the sign of the regression coefficient of the moderator may not indicate anything (Mossholder, Kemery & Bedeian, 1990).

Because of these reasons, possible interaction effects were determined using General Linear Model univariate assessments. Although a crude method for testing for moderation compared to SEM solutions, a full SEM-based analysis of moderation was outside of the scope of this research. The tests showed an interaction effect of gender on the relations of PE and H to INT. Experience showed to interact with the relations of ATT, EE, SC, SN and CH to INT, of SC and SN to H, of CH to INT, of INT to USE, between CH and H, and of CH to USE. Interestingly, the only interaction effect found for age was with the correlation between H and CH. The results of this analysis of moderation will merely serve an indicative function.

Discussion

The most important finding in this study is that habit has a large impact on both intentions and behaviour. This supports Limayem et al's (2003) finding on the important role of habit in IS use, now applied to the UTAUT model and online newspapers. The pattern is clear in *all* of the models that were constructed: as long as habit is left out of the models, the influence of intention on perceived usage is large. As soon as habit is included, intention's effect on perceived use drops dramatically. The effect habit had on use was roughly three times that of intention. A strong reinforcing effect on intention, performance expectancy and effort expectancy was also shown by habit. Its role has important ramifications for studies using the UTAUT model to explain behaviour rather than to predict adoption. Omitting habit can lead to serious misinterpretation of causal effects. In a setting where technology acceptance has to be predicted, habits can not have developed. Care should still be taken that habit formation is controlled for when use behaviour is measured after a period of use.

Because behaviour was explained instead of predicted, and because the UTAUT had not been applied to an online newspaper context before, scale development was needed. Additionally, a specification search was necessary because the hypothesized model's fit scores did not meet cutoff criteria. This resulted in a model that is in part data driven, but all changes to the structural model had theoretical or empirical support. Additionally, the final measurement model had items that reflected the latent variables well.

The test panel that was used for this study is used in other research as well and is intended as a cross-section of a region in the Netherlands, which speaks for the case of external validity. However, participants that had no knowledge whatsoever of the online newspaper in question were excluded from the survey, which may have introduced bias in the results. Univariate skewness and kurtosis were within acceptable parameters, but the multivariate distribution was non-normal. Ordinal data were used while maximum likelihood estimation assumes interval data. Because of this fit scores and regressions found should be interpreted with care. At the very least, the structure of the model and the sizes of regressions relative to each other are very informative.

Even though the questions for habit and habitual print newspaper reading were worded in the same manner, Cronbach's alpha was a lot higher for the items measuring the latter. Apparently, respondents' perceived habitual use of print papers was easier to self-assess than their habitual visits of online news sites. This is probably due to the fact that print newspapers have been

around far longer. Reading the daily paper is a widely known routine while habitually frequenting an online paper is not as clearly framed in people's minds yet. Another possibility is that admitting to habitually read print papers is socially accepted while admitting to habitually read an online newspaper is not.

The effects of technical conditions (called facilitating conditions in this study) on performance expectancy and effort expectancy, and the effects of performance expectancy and effort expectancy on attitude showed patterns similar to those found in other studies. Attitude did not fully mediate the effects of performance expectancy and effort expectancy on intention; in fact, attitude itself had no significant effect on intention. Effort expectancy showed no significant effect on anything but attitude. This suggests that the deliberate intention to use a website with an information-providing goal (such as a news site) is determined more by utility than because it is fun or easy to use. This does not mean that attitude and effort expectancy are irrelevant. More likely attitude and effort expectancy have to rise above some minimum level before performance expectancy can become the deciding factor. In other words, had the online newspaper been terrible to use, performance expectancy would have mattered less. Respondents' ratings for effort expectancy and attitude in this study do not counter such reasoning as they were high.

Another possibility is that attitude and effort expectancy should have been measured using a more sensitive instrument. Ajzen (2002) advised to use 7-point Likert scales to measure attitude, for instance. This possibility is less likely because the relations between effort expectancy, performance expectancy and attitude showed a pattern of regression weights that is visible in many empirical studies using those concepts. If the instrument were flawed, such a pattern is hard to uncover.

Another unexpected effect is the positive relation from counterintentional habit to intention, implying that reading print newspapers is in fact not counterintentional in this study. It could suggest that people who have a habit of reading print newspaper are also more inclined to look on the Internet for the latest news. Another possible explanation is that print and online newspapers are complementary. A sample bias should be noted here: Respondents are likely to be readers of the print equivalent of the online newspaper. Further research is needed before a conclusion can be drawn.

The direct effect of habitual reading of print newspapers on perceived use was small and only significant in the final model, and even then only at the 0.05 level while the rest of relations were

significant below the 0.001 level. It is believed to be what Meehl (1990) calls a “crud” effect: a relation that though statistically significant, is of no use for further interpretation.

This study showed that items for social context (peer use) and social norms load well under a single social influence construct, confirming Snook’s (2005) findings. However, the effect of peer use on habit is different from social norms’ influence on habit. Because of that, it is advised to model peer use and social norms as separate concepts in future studies, to avoid potential misinterpretation.

Moderators were not exhaustively tested. A general analysis showed that experience had possible interaction relations with nearly all the relations present in the model. A tie with habit is expected as experience is a precondition for habit. Gender and age did not appear to have much effect on the relations, but it was interesting to see that age only had a possible interaction effect on the correlation between habit and counterintentional habit. This is plausible as one can assume that older people have developed more habitual use of print newspapers.

Intention and use were measured using a single indicator, which could limit the generalizability of the findings in this article. Facilitating conditions were operationalized as technical conditions in this study. An operationalization more in line with Venkatesh et al.’s (2003) intended meaning of facilitating conditions is left to future studies of online newspaper use. Including both habit (as automaticity of behaviour) and past use in future research and researching their differences could prove interesting. It should shed light on the reinforcing effect habit exhibited on performance expectancy and effort expectancy. Some of the items used to measure habit discriminated poorly between habit, performance expectancy and attitude. The answers for social influence contained a lot of “I don’t know”-type responses (roughly 10-20% of answers). These were argued to be equal to neutral responses on the Likert scales. More accurate questions for assessing habit as automaticity of behaviour should be developed and the items for social influence need better formulations or differently stated middle values in follow-up research.

The final model presented here should be applicable in a somewhat more generalized online context. Regression weights will probably change for different kinds of websites. The model for online news sites can be condensed to three findings: the perceived utility of the site influences intention, habitual use of the online newspaper affects intentions and usage, and habitual reading of the print newspaper affects intentions to read the online newspaper. The possibility for

equivalent models is always present, especially since large parts of intention (62,3%) and use behaviour (44,4%) remain unexplained.

A more substantive interpretation of the final model requires that it is first validated by an independent sample. This is an important avenue for further research. Although the data set used in this study lent itself to a split in two parts, using one to construct the model and the other to validate it, it was chosen to construct a model that was founded on as much real data as possible, with reliable fit scores. According to Murphy (1983), cross-validating within a single sample is fooling oneself.

Findings from prior studies that the UTAUT model (after realignment of facilitating conditions) appears to have good model fit in usage studies are confirmed. The UTAUT offers an empirically supported and structured way to research determinants of reading online newspapers. The final model presented in this paper is less parsimonious than the original UTAUT model but provided some valuable insights, has better fit and has more explained variance. In conclusion, habit is a major factor to include in continued IT usage studies, while the findings on perceived peer usage and counterintentional habit are interesting new subjects for future studies.

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Appendix A: Survey items in the questionnaire

<i>PE questionnaire items</i>
The online newspaper makes reading the news more interesting. The online newspaper allows me to follow the latest news better. The online newspaper makes me able to read the news quicker. I remember more from what I read on the online newspaper. I think the online newspaper is useful. It is useful to use the online newspaper.
<i>EE questionnaire items</i>
It is not easy to use the online newspaper. Using the online newspaper is not difficult to learn. It is easy to navigate the online newspaper. It is simple to become good at using the online newspaper. I think the online newspaper has a clear structure.
<i>SI questionnaire items</i>
I regularly see people around me use the online newspaper. I regularly see classmates or colleagues use the online newspaper. People whom I respect, think I should use the online newspaper. Other people think I should use the online newspaper. I use the online newspaper because a large portion of the people around me uses it.
<i>FC questionnaire items</i>
My computer has no problem displaying the online newspaper. The online newspaper loads quickly when I visit it. I experience technical difficulties using the online newspaper. The online newspaper is correctly displayed on my screen. I have enough time to visit the online newspaper. I have enough knowledge to use the online newspaper. Reading the online newspaper fits my reading style.
<i>ATT questionnaire items</i>
Reading the online newspaper is fun. Reading the online newspaper is nice.
<i>H questionnaire items</i>
I am used to reading the online newspaper. Reading the online newspaper has become automatic. Reading the online newspaper feels natural. When I want to read the news, reading the online newspaper is an obvious choice for me.
<i>CH questionnaire items</i>
Reading a print newspaper feels familiar. I am used to reading the print newspaper. Reading the print newspaper has become automatic. When I want to read the news, reading the print newspaper is an obvious choice.
<i>INT questionnaire item</i>
I intend to use the online newspaper in the forthcoming month.
<i>USE questionnaire items</i>
How often do you visit the online newspaper on average?
What is the duration of a visit to the online newspaper on average?

Appendix B: Survey items in the questionnaire, Dutch

<i>PE questionnaire items</i>
De online krant van TC Tubantia maakt het lezen van nieuws interessanter. De online krant van TC Tubantia stelt me in staat beter op de hoogte te blijven van het nieuws. Het gebruik van de online krant van TC Tubantia stelt me in staat om het nieuws sneller te lezen. Het gebruik van de online krant van TC Tubantia zorgt ervoor dat ik meer onthoud van wat ik lees. Ik vind de online krant van TC Tubantia nuttig. Het is nuttig om de online krant van TC Tubantia te gebruiken.
<i>EE questionnaire items</i>
Het is niet eenvoudig om de online krant van TC Tubantia te gebruiken. Het gebruik van de online krant van TC Tubantia is niet moeilijk te leren. Ik kan gemakkelijk de weg vinden op de online krant van TC Tubantia. Het is eenvoudig om goed te worden in het gebruik van de online krant van TC Tubantia. Ik vind dat de online krant van TC Tubantia een heldere structuur heeft.
<i>SI questionnaire items</i>
Ik zie mensen om me heen geregeld gebruik maken van de online krant van TC Tubantia. Ik zie mijn collegas of klasgenoten geregeld gebruik maken van de online krant van TC Tubantia. Mensen die ik respecteer, vinden dat ik de online krant van TC Tubantia moet gebruiken. Andere mensen vinden dat ik de online krant van TC Tubantia moet gebruiken. Ik gebruik de online krant van TC Tubantia omdat een groot deel van de mensen om me heen de online krant van TC Tubantia gebruikt. .
<i>FC questionnaire items</i>
Mijn computer heeft geen probleem om de online krant van TC Tubantia weer te geven. De online krant van TC Tubantia laadt snel als ik hem bezoek. Ik ondervind technische moeilijkheden om de online krant van TC Tubantia te gebruiken. De online krant van TC Tubantia wordt correct weergegeven op mijn scherm. Ik heb voldoende tijd om de online krant van TC Tubantia te bezoeken. Het lezen van de online krant van TC Tubantia past bij mijn manier van lezen. Het lezen van de online krant van TC Tubantia past bij mijn manier van lezen.
<i>ATT questionnaire items</i>
Het lezen van de online krant van TC Tubantia is leuk. Het lezen van de online krant van TC Tubantia is prettig.
<i>H questionnaire items</i>
Ik ben het gewend om de online krant van TC Tubantia te gebruiken. Het gebruik van de online krant van TC Tubantia is een automatisme. Het gebruik van de online krant van TC Tubantia voelt vertrouwd aan. Als ik het nieuws wil lezen, is het lezen van de online krant van TC Tubantia een voor de hand liggende keuze.
<i>CH questionnaire items</i>
Het gebruik van een gedrukte krant voelt vertrouwd aan. Het is een gewoonte van me om een gedrukte krant te gebruiken. Het gebruik van een gedrukte krant is een automatisme. Als ik het nieuws wil lezen, is het lezen van een gedrukte krant een voor de hand liggende keuze.
<i>INT questionnaire item</i>
In ben van plan de online krant van TC Tubantia de komende maand te bezoeken.
<i>USE questionnaire items</i>
Hoe vaak bezoekt u de online krant gemiddeld?
Hoe lang duurt een bezoek aan de online krant gemiddeld?

Appendix C: Sample covariance matrix of the initial measurement model

	H4	H3	PE6	PE5	SI5	SI4	CH4	A2	A1	CH3	CH2	CH1	H2	H1	I1	U1	FC4	FC3
H4	.973																	
H3	.338	.623																
PE6	.303	.303	.547															
PE5	.317	.341	.374	.538														
SI5	.179	.102	.031	.052	.559													
SI4	.132	.046	.020	.023	.323	.628												
CH4	-.312	-.197	-.168	-.207	-.085	-.042	1.191											
A2	.357	.426	.295	.321	.128	.085	-.252	.652										
A1	.371	.391	.282	.293	.105	.067	-.228	.510	.576									
CH3	-.251	-.113	-.087	-.088	-.079	-.069	.744	-.132	-.125	1.113								
CH2	-.307	-.156	-.129	-.133	-.101	-.061	.900	-.179	-.154	.928	1.257							
CH1	-.259	-.130	-.094	-.120	-.121	-.083	.723	-.168	-.159	.760	.823	.923						
H2	.506	.333	.270	.280	.280	.195	-.346	.327	.347	-.224	-.280	-.259	1.080					
H1	.504	.420	.393	.388	.101	.066	-.399	.403	.394	-.253	-.335	-.255	.626	1.046				
I1	.424	.253	.272	.294	.025	.047	-.163	.237	.258	-.103	-.119	-.087	.376	.453	.707			
U1	.744	.578	.481	.479	.209	.098	-.572	.522	.539	-.493	-.552	-.425	1.064	1.132	.815	3.215		
FC4	.132	.136	.102	.126	-.049	-.027	-.042	.130	.121	-.046	-.034	-.006	.038	.137	.123	.158	.445	
FC3	.116	.114	.095	.114	-.079	-.047	-.062	.116	.126	-.038	-.045	-.049	.063	.151	.103	.128	.205	.694
FC2	.136	.145	.124	.114	-.054	-.024	-.107	.132	.152	-.051	-.107	-.055	.064	.157	.131	.213	.189	.268
FC1	.163	.151	.109	.128	-.036	-.025	-.045	.150	.115	-.023	-.048	-.010	.054	.133	.161	.207	.211	.260
SI3	.192	.082	.081	.067	.307	.324	-.048	.125	.106	-.055	-.049	-.090	.183	.159	.078	.144	-.033	-.052
SI2	.303	.171	.127	.128	.278	.243	-.096	.202	.170	-.076	-.120	-.121	.327	.229	.131	.363	-.014	-.021
SI1	.299	.196	.162	.157	.253	.205	-.087	.198	.189	-.091	-.124	-.126	.343	.281	.193	.485	.020	-.011
EE5	.189	.299	.183	.191	.073	.040	-.009	.314	.252	.051	.002	-.034	.140	.158	.076	.049	.177	.137
EE4	.237	.256	.197	.203	.022	.012	-.075	.253	.230	-.054	-.064	-.043	.257	.248	.190	.276	.137	.131
EE3	.241	.281	.175	.184	.030	.022	-.101	.301	.244	-.039	-.074	-.054	.194	.230	.149	.282	.211	.200
EE2	.134	.168	.121	.129	-.018	-.036	-.050	.194	.163	-.016	-.012	-.013	.069	.156	.115	.123	.167	.181
EE1	.176	.187	.108	.146	-.037	-.048	-.078	.202	.165	-.042	-.078	-.044	.076	.131	.111	.120	.161	.287
PE4	.357	.241	.216	.220	.186	.163	-.237	.279	.267	-.155	-.193	-.179	.375	.369	.199	.442	.088	.098
PE3	.548	.327	.291	.276	.146	.086	-.247	.343	.330	-.195	-.250	-.224	.391	.403	.307	.495	.102	.105
PE2	.566	.308	.328	.345	.132	.083	-.263	.333	.335	-.167	-.240	-.186	.409	.471	.367	.622	.107	.108
PE1	.358	.303	.289	.276	.137	.121	-.189	.331	.309	-.147	-.176	-.162	.274	.327	.253	.444	.079	.050

Sample covariance matrix, continued.

	FC2	FC1	SI3	SI2	SI1	EE5	EE4	EE3	EE2	EE1	PE4	PE3	PE2	PE1
H4														
H3														
PE6														
PE5														
SI5														
SI4														
CH4														
A2														
A1														
CH3														
CH2														
CH1														
H2														
H1														
I1														
U1														
FC4														
FC3														
FC2	.577													
FC1	.344	.751												
SI3	-.023	-.007	.674											
SI2	-.016	.010	.312	.766										
SI1	.019	.018	.276	.565	.762									
EE5	.184	.159	.073	.081	.097	.763								
EE4	.144	.141	.014	.081	.091	.231	.606							
EE3	.247	.224	.040	.100	.093	.474	.305	.781						
EE2	.169	.208	.005	.015	.028	.287	.236	.389	.615					
EE1	.210	.229	.011	.006	-.005	.328	.239	.399	.296	.823				
PE4	.084	.102	.163	.210	.221	.173	.174	.185	.089	.098	.594			
PE3	.124	.140	.172	.261	.271	.218	.250	.221	.170	.195	.323	.939		
PE2	.105	.113	.142	.229	.274	.181	.248	.218	.136	.158	.314	.488	.859	
PE1	.076	.106	.108	.180	.193	.175	.152	.170	.108	.113	.321	.334	.351	.601

Appendix D: assessment of normality

Variable	min	max	skew	c.r.	kurtosis	c.r.
H4	1.000	5.000	-.148	-1.620	-.728	-3.998
H3	1.000	5.000	-.595	-6.533	.188	1.030
PE6	1.000	5.000	-.355	-3.897	.319	1.753
PE5	1.000	5.000	-.552	-6.059	.410	2.253
SI5	1.000	5.000	.357	3.915	-.411	-2.256
SI4	1.000	5.000	.124	1.364	-.506	-2.780
CH4	1.000	5.000	-.732	-8.034	-.201	-1.103
A2	1.000	5.000	-.514	-5.646	.117	.644
A1	1.000	5.000	-.461	-5.057	.242	1.326
CH3	1.000	5.000	-.879	-9.645	.208	1.139
CH2	1.000	5.000	-.872	-9.567	-.060	-.327
CH1	1.000	5.000	-1.214	-13.324	1.418	7.785
H2	1.000	5.000	.253	2.782	-.782	-4.291
H1	1.000	5.000	-.345	-3.783	-.741	-4.065
I1	1.000	5.000	-.703	-7.714	.734	4.029
U1	1.000	7.000	.130	1.425	-1.061	-5.821
FC4	1.000	5.000	-.949	-10.413	2.716	14.909
FC3	1.000	5.000	-1.151	-12.637	1.715	9.414
FC2	1.000	5.000	-.855	-9.382	1.285	7.054
FC1	1.000	5.000	-1.624	-17.823	3.401	18.664
SI3	1.000	5.000	-.139	-1.525	-1.107	-6.077
SI2	1.000	5.000	.200	2.199	-.311	-1.704
SI1	1.000	5.000	.101	1.105	-.338	-1.854
EE5	1.000	5.000	-.746	-8.194	.391	2.144
EE4	1.000	5.000	-.551	-6.049	.477	2.617
EE3	1.000	5.000	-.980	-10.755	1.176	6.452
EE2	1.000	5.000	-1.130	-12.405	2.454	13.467
EE1	1.000	5.000	-.989	-10.856	1.037	5.692
PE4	1.000	5.000	.114	1.247	.073	.399
PE3	1.000	5.000	-.346	-3.800	-.624	-3.425
PE2	1.000	5.000	-.422	-4.635	-.368	-2.018
PE1	1.000	5.000	-.055	-.602	.047	.256
Multivariate					231.450	66.706

Appendix E: final set of items used

<i>PE indicators:</i>	<i>PE questionnaire items</i>
PE1	The online newspaper makes reading the news more interesting.
PE2	The online newspaper allows me to follow the latest news better.
PE3	The online newspaper makes me able to read the news quicker.
PE4	I remember more from what I read on the online newspaper.
<i>EE indicators:</i>	<i>EE questionnaire items</i>
EE1	It is not easy to use the online newspaper.
EE2	Using the online newspaper is not difficult to learn.
EE3	It is easy to navigate the online newspaper.
EE4	It is simple to become good at using the online newspaper.
EE5	I think the online newspaper has a clear structure.
<i>SI indicators:</i>	<i>SI questionnaire items</i>
SI1	I regularly see people around me use the online newspaper.
SI2	I regularly see classmates or colleagues use the online newspaper.
SI3	People whom I respect, think I should use the online newspaper.
SI4	Other people think I should use the online newspaper.
<i>FC indicators:</i>	<i>FC questionnaire items</i>
FC1	My computer has no problem displaying the online newspaper.
FC2	The online newspaper loads quickly when I visit it.
FC3	I experience technical difficulties using the online newspaper.
FC4	The online newspaper is correctly displayed on my screen.
<i>ATT indicators:</i>	<i>ATT questionnaire items</i>
A1	Reading the online newspaper is fun.
A2	Reading the online newspaper is nice.
<i>H indicators:</i>	<i>H questionnaire items</i>
H1	I am used to reading the online newspaper.
H2	Reading the online newspaper has become automatic.
<i>CH indicators</i>	<i>CH questionnaire items</i>
CH1	Reading a print newspaper feels familiar.
CH2	I am used to reading the print newspaper.
CH3	Reading the print newspaper has become automatic.
CH4	When I want to read the news, reading the print newspaper is an obvious choice.
<i>INT indicator</i>	<i>INT questionnaire item</i>
I1	I intend to use the online newspaper in the forthcoming month.
<i>USE indicator</i>	<i>USE questionnaire item</i>
UB1	How often do you visit the online newspaper on average?