

Acceptance of Future Technologies Using Personal Data: A Focus Group with Young Internet Users

Fabian Hermann, Doris Janssen, Daniel Schipke, and Andreas Schuller

Fraunhofer Institute of Industrial Engineering
Nobelstr. 12, D-707569 Stuttgart, Germany
{fabian.hermann,doris.janssen,daniel.schipke,
andreas.schuller}@iao.fraunhofer.de

Abstract. Future technologies in smart and social environments are expected to use personal data extensively. As young users of today's social web platforms already take risks of privacy loss, the question of acceptance of technology using personal data and influencing factors appears of to be of strong relevance. We present results from a focus group with ten young internet users which indicate different attitudes on privacy and different aspects of social influence on use decisions. Implications for technology acceptance theories are discussed.

Keywords: Technology acceptance, smart environments, social web, privacy.

1 Introduction

Ubiquitous computing systems are described as complex systems that use situational and personal data, derive conclusions from them, and adapt the system UI and behavior partly autonomously (see e.g. IST Advisory Group, 2001, 2003). These functionalities rely on highly integrated data on the physical environment, situation, but also the user's location, preferences, interaction behavior, etc. In this respect, future ambient and mobile social systems bear similar and even higher risks as currently discussed social web platforms: Users risk a loss of privacy because of permanent storage of personal data, profiling and address trading by hosts etc. (Hildebrandt, 2008). Nevertheless, social web media are broadly accepted in the markets (Universal McCann, 2008) and a frankness unexpected until now spreads in particular among younger users (The National Campaign, 2008). On this background, factors influencing technology acceptance appear to be of high relevance.

2 Technology Acceptance Theories

The acceptance of technical systems was well investigated in various studies resulting in models that describe factors influencing user acceptance.

One of the well established theories is the Technology Acceptance Model TAM (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Venkatesh & Davis 2000). This model predicts the intention to use a system. The factors influencing this intention are:

- usefulness: the perceived or expected practical advantages of the system
- effort: the expected effort to use the system

Other variables were not included in this original model, as it was assumed that other important factors like individual abilities, tasks, system type, situational constraints etc. mediated the perceived usefulness and effort.

In order to model these external variables explicitly, a new version of TAM, the *Unified Theory of Acceptance and Use of Technology UTAUT* was proposed (Venkatesh, Morris, Davis, & Davis, 2003). It assumed that system use is influenced by “facilitating conditions” like system accessibility, training support etc. Due to the UTAUT, the intention to use a system is depending not only on the expected system “performance” and effort expectancy but also by *social influence*. Social influence measures the perception of social pressure to use a system.

These models were mainly indented to predict system acceptance in organizational contexts and professional use. They were also applied and partly adapted to describe consumer decisions for private technology purchase and use (e.g. Carlsson et al., 2006; Kwon, 2000; van Biljon et al., 2007).

While these studies worked on more classical technologies, the acceptance of emerging technologies using personal data was investigated by acceptance models of ubiquitous computing services. Beier, Rothensee, and Spiekermann (2006) used the following predictors for acceptance of such technologies (together with the already introduced “usefulness”):

- Risks, e.g. loss of time or financial risks that may result from system use a user perceives
- Control: perceived controllability of system behavior by the user

Both variables were expected to influence the usage intention via the emotional attitude towards a system as a mediating variable. Spiekermann (2008) added another variable:

- Privacy: necessity to provide private data and the user’s concerns of them being given away. This variable was expected to have a negative impact on usage intention via the mediating variable “affective attitude”, i.e. the general emotional attitude towards the system.

Taken together, the acceptance research found stable effects for usefulness as well as practical issues like effort or expected risks. Newer results on future systems stress the influence of perceived control on usage intention. Interestingly, concerns about private data were hypothesized, but could not be shown to have significant impact on usage intention (Spiekermann, 2008).

3 A Focus Group with Adolescents

To get a picture about young internet user’s privacy-related behavior, their use of internet platforms and applications, and acceptance we conducted a focus group with young internet users. Further discussion topics as the participants’ ideas and wishes for future technology trends yielded no relevant results and therefore are ignored here.

3.1 Procedure

Sample. Two sessions were carried out with altogether 10 participants. In one session, 6 participants from 14 to 17 were invited. In a further session, 4 adolescents from 17 to 19 participated. Participants have been acquired by a chain email advertisement initially send to employees of an university institute. The sample can be characterized as follows: 6 male, 4 female, age from 14-19, internet use on average since the age of 10, mobile phone use on average since the age of 8, average online time 3.7 hours per day. Participants used instant messenger like ICQ, MSN or Skype very frequently as their main online communication medium. They stated to send 25 mobile short messages (sms) and 16 emails per week on average. Stationary computers are mainly used for instant messaging, gaming, and music. Also school tasks play an important role on the PC. Mobile phone games do not play an important role for any participant. This pattern of frequent use of online communication was quite homogeneous amongst participants. No participant used online media rarely.

Open Discussion. After an initial questionnaire on internet behavior and general communication patterns (like mobile phone use and instant messengers) a creativity method (6-3-5 method) was used to initiate the discussion. The following discussion on generated ideas was moderated by one session leader with the goal to foster a vivid, open exchange of thoughts. The topics included current use of technology, acceptance of new technologies and privacy behavior, and ideas and expectations on future life and its support through computers, internet, artificial intelligence etc. In some cases, the moderator directly posed open questions on the topics of interest to direct the discussion and to encourage statements on issues like privacy or social pressure. Many issues were addressed repeatedly, while others were discussed only once depending on the argument line of the open discussion. The analysis of the discussion was done by transcribing parts of a session video. A rater clustered discussion statements related to the issues of acceptance, privacy, and social influence. Statements are qualitatively interpreted in the following chapter.

Questionnaire with Open Items. Last step of the session was a questionnaire with several questions on particular issues on communication technology use. The following open items directly addressed the participants' attitude towards data privacy and related behavior:

- How do you safeguard your personal data using the internet (in general, when using blogs, communities, chats)?
- Are you using pseudonyms?
- Are you feeling watched when surfing the net?
- Do you think it's good if companies use your data (e.g. which sites you're visiting) to give you personalized offers and advertisements?
- How important is the fact to you that no one knows which sites you visited? Why?
- If you are chatting or surfing the internet is it important to you that no one can watch your monitor and see what you're doing?

On the basis of the individual answers to these questions a rater classified the participants into types of attitudes towards privacy. It was possible to synthesize categories that describe the main direction of the answers of each participant. For most participants, the answers to the different questions appeared to be quite

homogeneous. In many cases, participants referred to their own answers on previous questions. However, some answers of two users were inconsistent. The rater then decided to assign these users to the category based on the most prevalent answers.

3.2 Results: Different Attitudes towards Protection of Private Data

The following categories were derived to characterize the users' privacy-related behavior and attitude:

- **Naive users** aren't aware of any problems regarding data protection. These users don't think that anybody would be interested in his special actions or personal data, so nobody would try to find out about them. A characteristic statement of one participant (14, male) was: "I don't feel observed and nobody can see what I have made, because nobody knows my password".
- **Frank users** don't mind about privacy and are willing to let anyone know things about themselves. Typical statements here expressed that one has nothing to hide. For example, one participant (male, 18 years old) answered "Many people can see what I'm doing [in the internet]. But I don't care about it. I don't have anything to hide."
- **Sensitized users** are aware of risks and potential problems from publishing private data. They are willing to live at the best with it. They adopt strategies to protect private data or identity, for example, by using different personas, trying to act anonymous, or avoiding using tools they don't trust. A typical statement here was given by a participant (15, male): "I use usually different nick names and change my identity."

Figure 1 shows the distribution of the different user characteristics amongst the ten participants of our focus group.

3.3 Results: Social Influence on Technology Acceptance

During the open discussions, participants stressed the fact that not participating in communication technologies, in particular social internet platforms would result in alienation from the peer group. One of the participants said that one would feel as a loner if one would be the only one not using a certain technology. Another participant said that if you don't share information in a social network, then no one "would like to chat with you via IM".

Another set of arguments addressed social facilitation: Participants said that if everyone would get used to a technology or interaction mode, public behavior would become acceptable even if it had appeared awkward before (like using speech commands or gesture interaction on a mobile phone in public). Participants also mentioned they would use communications media like instant messengers or social community platforms when interacting with younger people, whereas using e-mail was to send job applications or to communicate to older people.

A variant of this argument appeared when the issue of embarrassing content like party photos posted in social communities was raised. One of the older participants said that a prospective employer searching for applicant's web information would wonder if there were only well-behaved pictures in your profile. Participants

discussed that people might reason why someone has no party pictures, that they are hold back on purpose, or that he has no social contacts whatsoever.

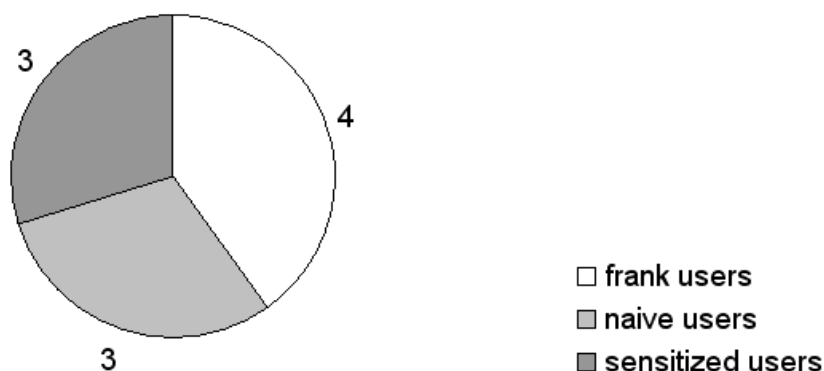


Fig. 1. Frequency of user's attitudes (absolute numbers)

4 Conclusions

The results of the focus group show two aspects that may have impact on acceptance research:

4.1 User Attitudes on Privacy

We found indication that users have different attitudes towards privacy. According to the statements users made during the session, they have adopted different behavior styles from naive and unaware use of profiles to the strategies sensitized users follow to protect private and identity information. The age distribution in our small sample support the assumption that privacy issues become more important the older users get and the more they acquire knowledge and media competences.

This suggests that privacy and other factors on acceptance may not only depend on features of the system and the user's evaluation of them, but also on person characteristics like e.g. knowledge about information use and risks, experiences with concrete consequences of publishing private data, etc. However, it seems not to be plausible that interindividual differences in privacy concerns are stable. In particular for the participants in our focus group, we assume some of the different attitudes to represent different stages of knowledge about risks and possible consequences of risky behavior. There might be more stable differences found when looking at a broader range of age. The general idea of different attitudes on technology and resulting user types of acceptance can also be found in the field of innovation adoption (Rogers, 2005), were different typical behavior styles of adopting new technologies are characterized.

This may have implications on the modeling of privacy perception in the acceptance models: Even if no significant influence of privacy concerns on acceptance as subjective measure could be found (Spiekermann, 2008), there might be

an influence on use behavior and strategies. Also subgroups of differently sensitized users who do care about technologies risks might be found.

4.2 Peers Influencing Usage Decision

Several statements of our focus group highlight the social influence on decisions to use or avoid technologies. Statements imply direct peer pressure from the adolescent's friends and peers as well as informal comparisons with the cohort of comparable age and social group that seems to have impact on personal decisions to use a technology. Communication media used in the age-group of adolescents seems to be much more attractive than "old-fashioned" means of communication like e-mail. Generalized expectations by others and norms of technology are taken into consideration when deciding for usage. They also seem to influence the acceptance of possible-known or unknown-risks like abandoning parts of privacy. Although not occurred in our focus group, we expect a further interesting aspect of social influence to have impact on voluntary usage decisions: Peers may serve as trusted behavioral models that facilitate purchase decisions by reducing complexity of research on advantages and risks.

An integrated model of user acceptance should cover the known influences like usefulness, risks and privacy, but also different types of social influence. The already investigated construct in UTAUT (Venkatesh et al., 2003) of social influence was found to be moderated by other variables, in particular usage experience (Li, Kishore, 2006). The concepts of self-identity and related internalized norms (a well-established variable from the theory of reasoned action, Fishbein & Ajzen, 1975) was shown to have impact on technology acceptance also for voluntary decisions but it's relation to other constructs are open (Lee, Lee, & Lee, 2006).

Considering the privacy risks of current social media and future technologies the clarification of social influence on technology use and risky behavior still is of high importance as well as the investigation of related believes and attitudes among users and social mechanisms.

References

1. Beier, G., Rothensee, M., Spiekermann, S.: Die Akzeptanz zukünftiger Ubiquitous Computing Anwendungen. In: Heinecke, A.M., Paul, H. (eds.) *Mensch & Computer 2006*, pp. 145–154. Oldenbourg Verlag, München (2006)
2. Carlsson, C., Carlsson, J., Hyvonen, K., Puhakainen, J., Walden, P.: Adoption of Mobile Devices/Services — Searching for Answers with the UTAUT. In: *Proceedings of the 39th Annual Hawaii international Conference on System Sciences*, vol. 6 (2006)
3. Davis, F.: Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly* 13(3), 319–334 (1989)
4. Davis, F., Bagozzi, R., Warshaw, P.: User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science* 35(8), 982–1003 (1989)
5. IST Advisory Group: Scenarios for ambient intelligence in 2010. Final Report. European Commission (2001),
<ftp://ftp.cordis.lu/pub/ist/docs/istagscenarios2010.pdf>
 (21.2.2009)

6. IST Advisory Group. Ambient Intelligence: from vision to reality. Draft Report (2003), ftp://ftp.cordis.lu/pub/ist/docs/istag-ist2003_draft_consolidated_report.pdf (21.2.2009)
7. Fishbein, M., Ajzen, I.: Belief, attitude, intention, and behavior: An introduction to theory and research. Addison-Wesley, Reading, MA (1975)
8. Hildebrandt, M.: Profiling and the Rule of Law. *Identity in the Information Society Journal* (2008)
9. Kwon, H.S.: A Test of the Technology Acceptance Model: The Case of Cellular Telephone Adoption. In: *Proceedings of the 33rd Hawaii international Conference on System Sciences*, vol. 1 (2000)
10. Lee, Y., Lee, J., Lee, Z.: Social influence on technology acceptance behavior: Self-identity theory perspective. *SIGMIS Database* 37(2-3), 60–75 (2006)
11. Rogers, E.M.: *Diffusion of Innovations*, 5th edn. Free Press, New York (2003)
12. Spiekermann, S.: *User Control in Ubiquitous Computing: Design Alternatives and User Acceptance*. Shaker Verlag, Aachen (2008)
13. The National Campaign, Sex and Tech-Results from a Survey of Teens and Young Adults (2008), <http://www.thenationalcampaign.org/> (21.2.2009)
14. Universal McCann, Power to the People. Social Media Tracker Wave 3 (2008), http://www.universalmccann.com/Assets/wave_3_20080403093750.pdf (21.2.2009)
15. van Biljon, J., Kotzé, P.: Modelling the factors that influence mobile phone adoption. In: *Proceedings of the 2007 Annual Research Conference of the South African institute of Computer Scientists and information Technologists on IT Research in Developing Countries* (2007)
16. Venkatesh, V., Davis, F.: A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science* 46(2), 186–204 (2000)
17. Venkatesh, V., Morris, M.G., Davis, G., Davis, F.: User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly* 27(3), 425–478 (2003)