

# User Requirements Analysis for Ambient Assistive Living (AAL): Affective Improvement of Methods for Technology Acceptance Evaluation

**Özge Subasi**

CURE: Center for Usability  
Research & Engineering  
Hauffgasse 3-5, 1110 Vienna,  
AUSTRIA  
[subasi@cure.at](mailto:subasi@cure.at)

**Michael Leitner**

CURE: Center for Usability  
Research & Engineering  
Hauffgasse 3-5, 1110 Vienna,  
AUSTRIA  
[leitner@cure.at](mailto:leitner@cure.at)

**Arjan Geven**

CURE: Center for Usability  
Research & Engineering  
Hauffgasse 3-5, 1110 Vienna,  
AUSTRIA  
[geven@cure.at](mailto:geven@cure.at)

**Manfred Tscheligi**

CURE: Center for Usability  
Research & Engineering  
Hauffgasse 3-5, 1110 Vienna,  
AUSTRIA  
[tscheligi@cure.at](mailto:tscheligi@cure.at)

**Cristina Buiza**

INGEMA  
c/Usandizaga, 6  
20002-Donostia  
SPAIN  
[cbuiza@fmatia.net](mailto:cbuiza@fmatia.net)

**Abstract**

In this paper we report our findings about methods that are commonly used in the research of AAL technologies for elderly people with special needs especially for requirements assessment and technology acceptance & evaluation. In the use of methods like interviews, focus groups, and cultural probes, we noticed that elderly users hardly report information on everyday problems, everyday facts, routines, values and self-perception, which we see as key elements for the acceptance of technology. We discuss the problems and propose improvements of these methods by refocusing on values and fears rather than articulated needs, further we try to move away from rational and cognitive argumentation towards affective evaluation of technology to make the step from analysis to evaluation and user acceptance more effectively.

**Keywords**

User Centered Design, Elderly, Methods, Ambient Assistive Living

**Introduction**

In this paper we discuss problems, advantages and disadvantages of user-centered design methods used in

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the European AAL project HERMES [4] to elaborate them. The project develops ambient assistive living technologies for elderly people and focuses especially on the stimulation of cognitive abilities and help against forgetfulness, by providing external memory cues to the user as well as an interface to “browse” through their past and future.

To get information on user requirements, we used interviews, focus groups and cultural probes. Our work indicated that these methods have their own weaknesses especially when carried out with elderly users to figure out their needs. It can be discussed that these methods are hindered due to their characteristics of being short time studies and conducted partly in artificial environments. However, we still argue that due to time and budget restrictions they are widely used during AAL research projects for requirement analysis for furthering design matters to develop technologies. This work wants to enhance these techniques that contribute to the evaluation of AAL projects.

### **Motivation through Field Work**

*Interviews:* Our interviews recorded results about concerns like security and memory needs and gave us initial input about elderly user’s feelings and psychology. An inclusive idea about requirements within the AAL user group could not be retrieved, the real life context of the technology was not clear. But the information gathered through the talks, interviews and side stories made us ask further questions about the importance of *social* and *psychological* factors for the acceptance of it among elderly.

*Sample findings interviews (interviewer notes):* “...they **don’t feel** the need to have a device now... Many of the

interviewees report about **getting angry** at themselves and **being annoyed** when they need to search for something like glasses ... More severe is the fact that nearly all **are worried** about the future....”.

*Focus groups:* As interviews, focus groups work in a way that they uncover principle concerns but in a more collective way. By creating a mock-up of the system’s interface and trying to establish a link to real context situations, a material aspect was succeeded. With the mock up and the depolarized structure of the method we gathered further comments and comparisons. For example only after focus groups it was obvious that attitudes are more important than knowledge and self-esteem or ethical concerns play a great role in acceptance.

*Sample findings focus groups: (tester notes):* “... healthy habits and their practice are a matter of each person’s **attitude**. ...they consider the device that is intended to be developed on this project a useful device for **younger people with complex jobs** (i.e. executives) or maybe **for elder and more cognitively impaired people**. ... they are doubtful about the nature of the recordings performed by a device from an **ethical and legal** point of view.”

*Cultural Probes [1]:* Using cultural probes, we got a good overview of what elderly users do during a day, but again no impressions of problematic situations. For example HERMES Project respondents tend to describe unproblematic living situations caused by the understandable fear of being a person who needs assistance (I can manage it), self recognition of problems and getting frustrated.

*Sample Findings Cultural Probes:* Pictures taken by elderly as a part of HERMES probes reflect this

dimension very clear. The captured frames are all "beautiful" like a corner full of books, a tidy living room or a scene from balcony. Hence, finding relevant problems for the design of assistive technology was still a challenging task.

Overall, the user requirements phase was successful in identifying the most relevant problem fields our assistive technology should address but still we believe that potential improvements of the methods should be discussed on the basis of our findings.

#### **Interpreting results & developing new methodologies:**

The overall conclusion was that elderly were reluctant to report any problems, which related to specific values with this generation at least in Austria ("be modest and take it as it is"). Lack of experience/knowledge is a dominant reason in decision-making. In such situations (low information access) socio-psychological findings [1] show that respondents choose to take the most direct way - in our case this would be *rejecting a technology*-. Still, we have to evaluate our findings in reference to actual and future technology acceptance especially for e-inclusion[3] reasons as technology is "unavoidable".

**Affective vs. cognitive argumentation:** Interviews and focus groups follow a cognitive way of discussing pros and cons of proposed technology. However, during fieldwork we noticed that respondents' attitudes are rather affective. Psychology argues that affective attitudes can be influenced by affective arguments but not by cognitive ones [1]. Although we do not attempt to change attitudes we still have to rebuild our methods in reference to cognitive vs. affective argumentation

(Can we expect someone to respond cognitively to an issue although her/his attitude is mainly affective?). Our hypothesis is supported by the fact that the more we used material connections in our methodologies the closer we were to the problems that elderly face, losing contacts, fears about their health getting worse or the importance of being responsible to others. These were important factors for an elderly user to start dealing with a technology but slight changes in health situation year by year were not. We therefore want to reformulate these methods in order to find out how we can design technology for elderly users and propose the following methodologies with an emphasis on values, fears and compeer-users in order to reach to the information that might help us to design/evaluate a more acceptable assistive technology:

- Affective / Fear centered Design
- Compeer users design and proxy probes

**Affective/fear centered design:** Our hypothesis is that focusing on worries instead of on needs will increase the accessibility of information to the researcher. Users typically do not exactly know which technology they want or need, but they know what they don't want or dislike. We further believe that this tendency is even stronger while interacting with elderly like talking about fears. Hence, by letting respondents speak about their fears rather than about their current problems, we can design technology accordingly. The methodology we pursue is to redesign interviews and focus groups in a manner that the output can draw the borderline of the related technology. Still asking questions on abstract and material issues; namely "communication" or "shopping list" the psychological aspects can better be covered and connected to the

technology evaluated. For example; if user mentions "I don't want to loose contact to my grandchild" ->it is logical to design a communication technology; or if user says "I don't want to loose my ability to organize my shopping by my self" there is no good to design a digital shopping list that does everything with one click".

**Compeer users design and proxy probes:** We further believe that to be in the focus was annoying for users and decreased the amount of information given as the information comes from their private area like reporting problems about their home, talking about their weaknesses etc. In focus groups we recognized that respondents show a tendency towards proposing technology solutions for others; hence we believe to possibly enhance the method by introducing such agents. Applying an interview technique that shifts the focus of the interview to a compeer user - which could be "a friend", "a relative" (etc.) - may improve the situation. Similarly, making the participant discuss and collect material related to daily issues, on the street, about transportation, badly designed products or making photos of things that other people concern may help us as a bridging methodology where we might have an idea about how our target group describes, reports problems, things they do not like. By using "compeer user" and "proxy probes" respondents would still inform us about the target group's concerns but in a broader context.

### **Conclusions**

The research indicate that it is not enough to persuade the user that the system/product work well and it is good for him/her, but possible obstruction due to values, social setting and self-perception must be

analyzed. In discussing fears vs. needs we argue that a value-framework is needed that focuses on this specific challenge. Such framework gives advice on which values are important to users in their home environments and every day lives. Designers are able to align technology along the lines of these values and not harm them (example: The user is proud to manage shopping list and here is presented a system that manages this task. This might cause the lost of self-esteem). These values are critical for acceptance and adoption of technology. As future work we are seeking to enhance existing technology acceptance frameworks [6] with reference to value-sensitive design approaches [4] to develop existing health assistive technologies.

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### **Citations**

- [1] Aronson, E.; Wilson, T.D.; Akert, R.M.; Sozial psychology, 4<sup>th</sup> edition, Pearson Education, Inc., 2004
- [2] Cooper, A. 1999 The Inmates are Running the Asylum. Macmillan Publishing Co., Inc.
- [3] E-inclusion Website [http://ec.europa.eu/information\\_society/activities/einclusion/policy/index\\_en.htm](http://ec.europa.eu/information_society/activities/einclusion/policy/index_en.htm)
- [4] Friedman, B.; Value-sensitive design. Interactions, 3(6) 16-23, 1996
- [5] HERMES Website <http://www.fp7-hermes.eu/>
- [6] Venkatesh, V., Morris, M. G., Davis, G. B., Davis, F. D. 2003. User acceptance of information technology: Toward a unified view. MIS Quarterly, Vol. 27. No. 3, September, pp. 425-478.