

Stakeholder involvement in the design and development of a domestic well-being indicator system. N.M.Gil, N.A.Hine and J.L.Arnott, Proc 10th International ACM SIGACCESS Conf on Computers and Accessibility (ASSETS 2008), Halifax, Nova Scotia, Canada, 13th - 15th October 2008, pp.267-268. DOI: 10.1145/1414471.1414531

Stakeholder Involvement in the Design and Development of a Domestic Well-being Indicator System

Nubia M. Gil, Nicolas A. Hine and John L. Arnott

School of Computing, University of Dundee, Dundee DD1 4HN, United Kingdom.

This is a pre-print report of research published in:

Proceedings of 10th ACM SIGACCESS Conf. on Computers & Accessibility (ASSETS 2008)

Halifax, Nova Scotia, Canada, 13th – 15th October 2008, pp.267-268.

ISBN: 978-1-59593-976-0

DOI: 10.1145/1414471.1414531

URL: The DOI Bookmark for the article: <http://doi.acm.org/10.1145/1414471.1414531>

Abstract: Older people living in their own dwelling may be at increasing risk of loss of well-being and quality of life as a result of changes in health or personal circumstances. Processing information gathered from sensors in the home and presenting it in the form of functional and practical interfaces to users might help decision-making before a critical situation arises in the older adult's life. The objectives of this study were to understand how to include various stakeholders in the design process and how to design intuitive and self-explanatory interfaces for older people and carers.

Keywords: Older adults, older people, user interfaces, stakeholder involvement.

Contact Address: N.Gil / N.Hine / J.Arnott,
School of Computing, University of Dundee,
Dundee DD1 4HN, United Kingdom.
{nubiagil / nhine / jarnott} at computing.dundee.ac.uk

INTRODUCTION

An inclusive design process following the ‘interactive design’ methodology was used throughout the requirements gathering, design and development of a domestic well-being indicator system.

Eleven older people (nine cared for and two informal carers), six occupational therapists, two physiotherapists, three researchers, three technologists and one policy maker attended a one-day workshop. The aim of the event was to establish different stakeholder perspectives about home-based care, the individual role of the stakeholders, and their expectations.

A small group of participants, two older people, one informal carer, one physiotherapist, two technologists and the principal researcher were part of the design team.

In this research we attempt to answer the following questions:

- How to include various stakeholders in the design process?
- How to design intuitive and self-explanatory interfaces for older people and carers?

METHODS AND METHODOLOGIES

The adaptation of the interactive design model proposed by Preece et al. [4], methodologies and recommendations proposed by many authors [3, 2] and guidelines to design for older people [1] helped the researchers to identify the users’ needs, design and develop the interfaces as follows:

- Identification of needs and user requirements: different elicitation methods were used to collect the requirements directly from the end users such as workshops, brainstorming and focus groups.
- Designing and re-designing a prototype: scenarios and paper-based prototypes were used during the design process.
- Building an interactive version: incremental versions of the prototype were presented to the group of participants in order to discuss and refine the user requirements and preferences.

Table 1. Concerns, requirements and information needs

Concerns, requirements and information needs	Older people	Informal carers	Professional carers
Reminder for medication, appointments and tasks	✓	✓	
Environmental conditions	✓	✓	
State of the occupant (mobility, personal hygiene, eating and drinking habits, sleeping patterns, medical conditions, social interaction and psychological behaviour)	✓	✓	✓
Data presentation preferences	Text	Text	Graphs, text and icons
Appropriate devices to display information	Television, mobile phone	Mobile (cell) phone	Laptop, computer (using Internet)

INCLUDING SOME STAKEHOLDERS

Table 1 lists the concerns, requirements and user needs collected using workshops, brainstorming and focus group sessions.

Taking into account the complexity of designing and developing a domestic well-being indicator system the design team focused the scope of the project on designing and developing some indicators of well-being (mobility, sleeping, eating and drinking, personal hygiene and medical conditions) and on presenting that data in visual and textual form via the Internet.

During a meeting the design team derived the functional requirements of the system: registering the customers (the occupant and the carer); checking changes of well-being indicators (mobility, eating and drinking, personal hygiene, sleeping and medical conditions) and checking trends of well-being indicators. In addition, ethical issues such as privacy of the information collected from sensors installed at home and the appropriate access control to the system were discussed.

A PROTOTYPE FOR OLDER PEOPLE AND CARERS

Involving all Users

The participants were given a list of scenarios, an interface template and a set of pieces to start designing a paper-based prototype. The following non-functional requirements were collected from the exercise: to display easy and self-explanatory graphs; have meaningful icons to help users to remember how to use the system; allow the end user to reconfigure the level of monitoring of the system according to their needs; reduce the level of intrusion as much as possible; and allow users to reconfigure their display preferences.

Using an Interactive Design Model

Based on the paper prototype, the functional and non-functional requirements for the system, the development of the prototype was commenced. Firstly, the user interfaces were coded and a very preliminary version was informally reviewed by two older people. Secondly, the first two functional requirements were developed. The researcher had a meeting with three of the participants (two older people and one occupational therapist) at which a second version of the prototype was informally evaluated.

They suggested making the following changes: to increase the size of the fonts and buttons; put clear labels close to the image in the buttons that represents the well-being indicators; add labels to axes on each of the graphs that represent indicators of busyness associated with well-being; use a standard interface template for the web pages to avoid confusion; explain the meaning of each option that appears in the horizontal menu. All suggestions and changes from all users were implemented in the final version of the prototype (see figure 1).

DISCUSSION

Regardless of the design process that has been presented to design user interfaces, it was very useful to involve the users from the beginning of the design process to have a more realistic view of the user needs, likes and dislikes. However, the design stage could be very much time-consuming when the profile of end users is quite varied. Therefore, further work is required to improve the efficiency of the design process that embraces the full range of user variability.

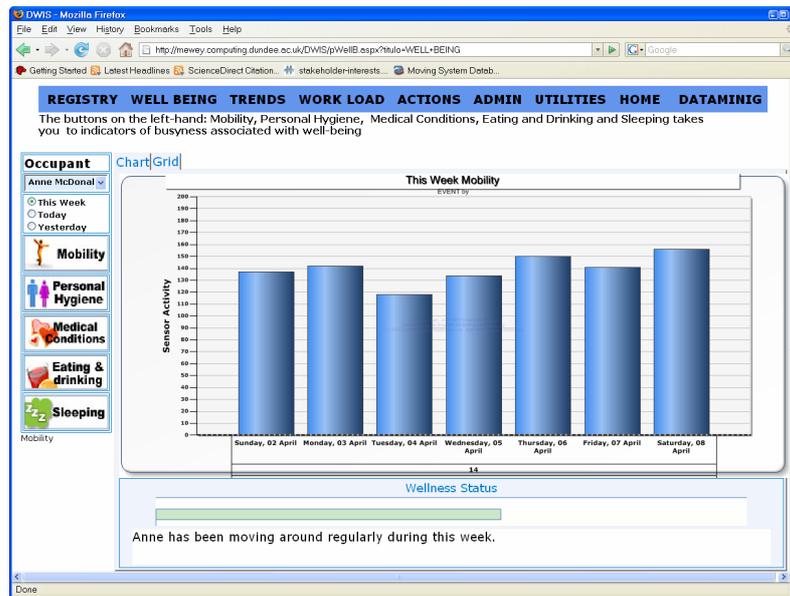


Figure 1. Example of the final version of the prototype.

CONCLUSIONS AND FUTURE WORK

Early user involvement and interactive design can be beneficial in the case of older adult users because it lets the researcher interact directly with end users to know their real needs and take into account their experiences to ensure that the final product meets the requirements.

Having different stakeholder perspectives helped the researchers to have a clearer spectrum of a domestic well-being indicator system. It was a significant challenge to establish an appropriate set of functions for each stakeholder because of the variability of their needs. Further evaluation of the system will be possible using a wider range of users.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the support of the Scottish Funding Council SRDG MATCH project HR04016 ("Mobilising Advanced Technologies for Care at Home") and the UK EPSRC EQUAL project GR/S29058/01 ("Supporting Independence: new products, new practices, new communities") and partners, including all staff and participants who contributed to the research.

REFERENCES

- [1] Fisk, A.D., Rogers, W.A., Charness, N., Czaja, S.J. and Sharit, J. *Designing for Older Adults: Principles and Creative Human Factors Approaches*. CRC Press, Boca Raton, USA, 2004.
- [2] Hagen, I. and Bjorneby, S. User and carer involvement in the development of assistive technology for people with dementia. *Proc. AAATE 2007*, IOS Press (2007), 809-814.
- [3] Newell, A.F., Dickinson, A., Smith, M.J. and Gregor, P. Designing a portal for older users: A case study of an industrial/academic collaboration, *ACM Transactions on Computer-Human Interaction (TOCHI)*, 13(3) (2006), ACM Portal, 347-375.
- [4] Preece, J., Rogers Y. and Sharp H. *Interaction Design: Beyond Human-Computer Interaction*. Wiley, New York, 2002.