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The "Free from Housing Accessibility Problems" App

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Abstract. The present study concerns the development of a computerized tool targeting housing accessibility issues. A user-centered approach involving professionals from the housing sector and senior citizens from four European countries resulted in a fully functional prototype of a mobile application (app) including an apartment database. The app raises awareness on housing accessibility and has the potential to support decision making and strengthen all citizens regardless of functional capacity to be more active in their endeavors for a satisfying housing solution. Further refinements and additional features are needed to enhance the potential benefits; they include addressing potential challenges facing senior citizens, developing interactive features that allow users to provide input and adapting to different national contexts to make the app applicable for the European market.

Keywords. Ageing, ICT products, housing provision, social innovations, user involvement

1. Introduction

In the near future it is expected that nearly a quarter of the European population will be older than 60 years [1]. The present housing provision is insufficient to meet the needs and wishes of the ageing population. For example, many people ageing with disabilities live in dwellings with stairs at the entrance, without elevators or ramps, and with many environmental barriers in the close outdoor surroundings. As more and more people are living longer periods of their lives with functional limitations and people more frequently receive home health care, the demands are increasing. Home and neighborhood environments that are inclusively designed support older people's activity and participation and affect autonomy and independence positively [2].

This paper is based on one of four work packages of the innovAge project (www.innovage.group.shef.ac.uk/), financed by the European Commission (2013-2015). The work package "User-driven Housing for Older People" aimed to support

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senior citizens to resolve accessibility problems as well as compare and evaluate housing options with regard to accessibility issues. The intent of the mobile application (app) developed in this work package was to empower people ageing with functional limitations to become more actively involved in decision-making in the context of housing provision. Ultimately, we aimed to develop an app with the potential to impact housing policies and housing provision practices across Europe and to improve the quality of life and well-being of senior citizens and informal carers. Accessible housing may prevent injuries, the need of care and the isolation of people with functional limitations as well as unnecessarily early relocation to assisted living facilities. Such effects may potentially lead to reduced societal costs for health care, social services and individual housing adaptions.

The outcome presented in the demonstration and poster zone at the UD2016 conference is an app optimized for a 10" surf tablet in a prototype stage intended to raise awareness on potential accessibility problems and how they can be resolved [3]. Making use of the scientifically recognized Housing Enabler (HE) methodology [4] for accessibility assessments, the app targets housing environments based on modern, user-friendly information and communication technology (ICT). The HE consists of one checklist for functional capacity in the individual and another for environmental barriers indoors, at entrances and in the immediate exterior surroundings of their home. After assessment, the data collected with the two checklists is used for an analysis of person-environment fit, resulting in an accessibility score.

2. Method

In an early explore phase in the process of developing a computerized tool, 26 senior citizens and 15 professionals involved in housing construction and housing provision in Sweden, Germany, Latvia and Italy were engaged in research circles [5]. Based on lessons learned, a user requirement specification (URS) for features and content common for the four countries was produced. A software professional was recruited to the design team to develop a universal solution of a prototype app with the potential be usable for people with diverse abilities in different national context across Europe. Actors from the housing provision sector in three municipalities in Sweden and one in Latvia took an active part in the process of collecting data on environmental barriers in 400+ apartments to establish a database. In a later phase of the research and development process the first prototype app was formatively evaluated in usability tests involving 30 senior citizens in Sweden and Latvia [6] and iteratively developed to meet needs and wishes elicited with the targeted group.

3. Results and Discussion

Through an iterative research and development process, a validated and fully functional prototype of a mobile app including an apartment database is available. The app can enable users to make more informed decisions about their current and/or future housing in their pursuit for a home free from the environmental barriers that potentially induce accessibility problems. The process led to a design solution that supports many of the challenges that may face senior citizens when using computerized tools:

- A mobile application was chosen as the solution because it has an intuitive interface appropriate for the large proportion of European senior citizens without computer experience.
- The app was optimized for a large surf tablet (10") to provide space for large font sizes and buttons to support people with visual impairment and/or impaired motor skill.
- Adequate contrasts were used to support people with visual impairment.
- Simple graphical solutions were used to reduce the visual stimuli and support people's cognitive ability to process information.
- The amount of text was minimized and the functions were made more task focused, simple and consistent to support people with a decreased attention span and short-term and working memory loss.
- Entered information and users' progress were visually summarized as feedback to support cognition and memory.
- Actions to affirm the entered information were added to offer the possibility to detect and correct inadvertent touches.
- Data visualization was improved to allow users to better perceive relationships and compare.
- Additional search criteria important for the targeted group (i.e. people aging with functional impairments) such as showing only apartments which can be accessed by elevator were added.

There is still room for refinements of the app to enhance the potential benefits and meet challenges that may face senior citizens in different national contexts. For example, participants in the usability tests found some of the terminology difficult to comprehend and requested explanations that use simpler/non-technical language. However, we did not change the wordings because the information about the environmental barriers also constituted the criteria for professional assessments. The assessments items have elaborated guidelines and a simplified language may risk changing their meanings. A possibility to get verbal feedback for people with visual impairment has not yet been implemented and tested. Interactive features that allow users to provide input could enable empowerment and create possibilities to influence physical planning towards more age-friendly environments. To support senior citizens regardless of national context, we have to consider differences in building traditions, legislation, policies for housing provision for senior citizens, housing markets and housing standards.

4. Conclusions

The present study adds knowledge and insights on design challenges related to an app that was iteratively developed for a relatively unexplored target group. The results point to a need for a more thorough exploration of design solutions that are tailored for people aging with functional limitations. The findings were useful in providing recommendations that were subsequently implemented in the prototype app during the iterative research and development process.

Our future agenda includes a new research project in participation with professionals from the housing provision sector and municipalities, aiming for further development and full-scale feasibility testing in different practice contexts.

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