

Health and Social Care Experts' Perceptions of a Ubiquitous Care System for Independent Living

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Abstract: Following the user-centered approach, focus groups of health and social care experts were organized in two stages. These aimed at identifying end-users' needs and requirements for the ubiquitous care system to support older peoples' independent living, the CONFIDENCE system. In the first stage, the results suggest four main user requirements derived from the data: easy to use, suitability, reliability and need for an alarm centre. In the second stage, the focus groups covered all parts of the system.

Keywords: ubiquitous, health care system, independent living, older people, expert focus group.

1. Introduction

The group of people over 65 years is growing faster than any other age group in the world. It has been projected that by 2060 this age group will have grown from 17% in 2008 to 30%. People aged 80 and over are the fastest growing segment within the older group. This is expected to represent 20% of the older population by 2050. Furthermore, people in the oldest segment of the population are particularly prone to falls [1]. The subsequent effects of falls impact direct and indirect costs to the family, health and social systems [2]. As the number of older people increase, the number of falls and associated expenditure is expected to increase accordingly.

The experience of falls can promote the development of fear of falling in older people. Fear of falling, in turn, can decrease quality of life and speed the decline in the ability to perform activities of daily living (ADL). Moreover, this situation might lead older people to self-imposed isolation, refusal of mobility, and admission to institutional care [3]-[6]. Falls and fear of falling need to be minimised to enable older people to remain autonomous, live in their own homes longer, and to decrease the costs of health and social care for this age group [7].

CONFIDENCE will be a care system supporting older people's independent living. Through RF technologies, it will localise tags worn by the user, reconstruct the bodily posture of the person, and interpret whether this is normal or anomalous, e.g., the person has fallen down. When an anomalous bodily position is detected an alarm will be issued to a designated receiver allowing for timely assistance to the user.

Following a user-centered approach, the aim of this study was to gather health and social care experts' perceptions in the design of the ubiquitous care system and develop user requirements based on these. The CONFIDENCE project aims to develop and integrate innovative technologies in order to detect abnormal events such as falls and unexpected behaviours, related to health problems of elderly persons. More detailed description of the system can be found [8],[9].

The information from health and social care experts was collected through focus groups in two stages. During the first stage, the questions concentrated on personal and institutional needs in daily living conditions. The other set of focus groups was conducted after the system's technical specifications were more mature. During the second stage, the questions concentrated on the technical characteristics of the system. The information collected served as input to the specifications of the system and to the modification of these in consonance with the results obtained. We conducted two focus groups on each of the two occasions. Ten experts participated in the first occasion and five in the second.

2. Method

The participants of the first focus groups were composed of health and social service providers extracted from the public administration (City of Jyväskylä and the Central Hospital of Central Finland in Jyväskylä), from private companies providing home care, and care in service houses.

The participants of the second focus groups, comprising experts and stakeholders, were recruited from the same people who participated in the first focus groups, except one who had not participated earlier. Five people participated in two focus groups. The first involved three participants and the moderator. The second was formed by two participants and the moderator. The moderator was the same in both groups. Each of the participants, and the moderator were female. Their average age was 42.4 years (range 23-52).

The focus groups were held in the Finnish language by experienced native Finnish speakers. The information provided about the project, the figures and diagrams describing the system and its components, in addition the questions guiding the interviews and focus groups were presented in the Finnish language to ensure that the participants understood the questions. Each participant was also a native Finnish speaker.

3. Results

In two different stages, we aimed firstly at identifying end-users' needs and requirements to specify CONFIDENCE. In the second stage, the aim was gathering end-user opinions about the system after the technical specifications had matured.

We studied user needs through a user-centred approach. Our focus was on the understanding of the user's goals, which possible obstacles they may encounter, and how they may avoid these obstacles. It was also important to understand the special needs of users' and the use context in which the users are immersed. In these interviews, we tried to form a holistic understanding about users' needs in their daily lives.

3.1 The first stage focus groups

The results suggest four main user requirements derived from the data: easy to use, suitability, reliability and need for an alarm centre. The system must be easy to use, e.g., the system does not provide too many options and the possible effects of aging do not hinder the use of the system. Poor eye sight and motor problems may impede the use of the system. The system should feature a multi-modal control interface. People with poor eye sight cannot use the system properly if the interaction is only based on a visual display. People with hearing impairments cannot use a speech based interface. Possible ways of interacting with the system can be, at least, a visual display or screen, voice recognition, and alarm sounds.

Suitability means that the system fulfils the basic needs, does not cause harm to the users, users are able to use the system taking into account their own cognitive and motor functional capacity, and the users are able to personalise the system. In general, the experts considered that older people are probably not willing to pay for such system. Instead, they may be willing to obtain the system from the public welfare system. CONFIDENCE should be durable and affordable. For a very old person, and especially for those suffering memory disabilities, the system should not demand to be removed in certain circumstances such as the shower.

Reliability is an important feature of the system. The system must have low false alarm rates, should be safe and accurate. The experts indicated that an alarm centre would be required to receive and manage the alarms.

3.2 The second stage focus groups

In the second stage, the whole system was discussed. Discussion topics were: the overall system, portable device, tags and sensors, base station and alarm handling.

While discussing the overall system, the possibility to live and feel independent without strict supervision was considered a positive aspect of CONFIDENCE in both focus groups. The attitude and support of home help services, nurses, and close relatives is very important. This support could influence how the older people accept the system and their willingness to purchase it. However, people's cognitive decline or disabilities could represent a challenge for the operation of the system.

The participants indicated that nowadays older people are not willing to pay for such system, but in the future this may change. The prospective of renting the system may be one possibility, while the public welfare system obtains it.

The portable device was thought to be good idea, but it will also cause design challenges. Multimodal interaction is important for people with hearing or sight disabilities. The device cannot be very big, but has to be enough big to afford good usability. The respondents defined the possibilities of

speech contact with an alarm receiver, of stopping alarm, and of raising alarm, as most important features of the system.

The small tag size was considered a positive aspect. The amount of tags and sensor was thought to be quite heavy, and this raises worries. Respondents were worried about how often the batteries must be changed or charged. Small tags will hold small batteries which are impossible to handle for some old people.

Respondents were satisfied with the base station. The comments dealt with extra features which may be added to the system later. Suggested additional features could be, for example, blood pressure monitoring.

Alarms are the heart of the CONFIDENCE system. Respondents thought that alarms should be automatic. After a fall, a person may be disoriented and may not understand the alarm. Approximations of how long the system should wait before sending an alarm were from 30 seconds to 3 minutes. Respondents' opinion was that the system should contact the next alarm receiver immediately if the first one is not responding. However, respondents preferred the alarm centre as the alarm receiver over friends or relatives.

4. Conclusions

All systems and devices are tools that humans use to achieve some goals [10]. This means that systems should be seen from the goal-oriented perspective. In the design of new types of interactions or systems, the starting point should be the holistic understanding of the users' goals and needs, the possible sources of obstacles and how the obstacles can be overcome.

Requirements for the ubiquitous healthcare system differ from traditional systems. The end-users of the health care systems have various health problems which affects their ability to use the devices. The starting point for designing a new ubiquitous system was naturally studying the end-users' goals and restrictions of which aging typically causes.

We are aware that the sample is small and generalizations cannot be made. However, health and social care experts' opinions are important sources of information for the development of the system, and eventually for accepting it once on the market.

The aim of the user-centred approach is to design a system which is intuitive to use, fulfils the needs of the users, and can be easily adopted for use. In accordance with the user-centred approach adopted by this project, the older people, as potential end-users of the CONFIDENCE system, will continue their involvement in other stages of the project. They will evaluate the system design and participate in usability studies. The end-users will also contribute to the validation of the resulting prototypes. Most importantly, the participation of the potential end-users will facilitate the adaptation of the system to their real needs, interaction capabilities, and preferences.

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