Social Engagement in Elderly Care Homes: Towards Designing an Application to Reduce Social Loneliness

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Abstract. This paper presents an application that is designed to reduce the loneliness of elderly and to support them in elderly care homes. The social application 'APPointment' allows users to plan social activities to undertake with fellows living within a closed community. The app was designed after conducting extensive user research and evaluation sessions with elderly. The results indicate that the target user group found the new app accessible, easy to use and most importantly quite effective in improving their social lives at the elderly care home.

Keywords: Elderly · Social loneliness · Social isolation · Application · Social engagement · Healthcare

1 Introduction

The population of elderly people, aged 65 or over, is increasing in western countries. The western world is also effected by the 'population ageing' phenomenon and as compared to the past more money is required for taking care of elderly [1]. On the contrary, most of the western countries are putting a cap on the health care and elderly care budgets. Due to budget cuts on health care programs in The Netherlands, inadequate budget is available for organizing activities for elderly, which dramatically decreases social interaction among elderly living in care homes. Besides, elderly experience the loss of loved ones and a decrease in their health, which increases social isolation even more and produces feelings of loneliness. Previous research [2] has shown that low levels of perceived social support are associated with increased depression, impaired immune functioning and reduced life expectancy. Enhancing elderly's social network appeared to be supportive in the reduction of social isolation and loneliness [3]. Most of the earlier research [4, 5] has focused on designing solutions for enabling elderly to establish connections outside an elderly care home

(e.g. with children or friends). Relatively less attention has been paid on designing solutions for elderly care homes, which help in strengthening social interaction among residents. The aim of this study is to design a social application for elderly living in different elderly care homes in the Netherlands in order to reduce their feelings of loneliness and improving their quality of life. The application was developed in an iterative manner. In the first phase, a number of user research sessions were conducted (both individual sessions and focus groups) at elderly care homes. After this, a number of early concepts were designed and tested with elderly. At the end a final working application was developed and tested with elderly in different elderly care homes. The rest of the paper describes this whole design process and key results.

2   User Research

A Context Inquiry (CI) was performed in order to understand users' requirement, their issues with loneliness, and their preferences on establishing social interaction with peers. The CI took place with a group of elderly in their natural context i.e. in an elderly care home after their weekly gymnastics class. The group consisted of eleven women and three men in the age of 67–83 years old. Their living situation, weekly activities, social needs and technology use were questioned in individual as well as focus group style interview sessions. Furthermore we also asked users to perform different tasks, primarily playful, on an iPad to get insights about their working knowledge of tablets and general experience with computers and technology.

Fig. 1. Focus group session

From the analysis of the interview it was concluded that the elderly are willing to meet other people of the same age and prefer interacting with people they already know. For example whenever they get a chance to meet other people e.g. during gymnastic classes they make sure that they do not miss any such opportunity as one user mentioned, "That is why we come here and work-out together, to see each other and drink a cup of coffee". They believe that better interaction with peers in an elderly care home could possibly be a solution for their social isolation. They like their

activities to be planned at fixed times during the week and, if possible, to find a place in a community center. The users prefer activities like jeu de boule, socializing, bingo, having a stroll outside, grocery shopping, or visiting a museum. They think that organizing such activities with others, who experience similar feelings of loneliness, could increase social interaction. They were worried about the fact that as compared to the past the government is spending less money on improving their social lives. For example one participant mentioned it this way, "There are care centers that organize activities for people to undertake together, but you have to pay for it, and they are shutting them down! These centers should be maintained".

We also learnt that none of the elderly have a smartphone but a few elderly do use their mobile phone to get in touch with friends and children outside the elderly care homes. Generally, they use these phones for a single task i.e. dialing and receiving calls and are not very comfortable with these phones. Most of the users also mentioned that their children and grand children do visit them once in while. Most of them, especially females, would like to meet their children more often but they also understand that it is not always easy for their children. Therefore, they mentioned that improving their quality of life in the care homes is very important.

The users indicated that they are eager to learn about new technologies such as tablets and smartphones, hence using them on daily basis is considered a fun activity. They also mentioned that although they were not familiar with tablets, using a tablet does not look like a complicated job. Few users did face problems while interacting with the tablet e.g. unable to find the right button to navigate, confusing menu structures, and inability to press the buttons with right sensitivity.

3   Conceptual Design and Prototyping

The primary user requirements for the first idea of the application were deducted from user research. Based on the analysis of the CI, interviews and focus group interviews four essential parts were prominent: (1) elderly are willing to strengthen their ties with people they already know, (2) they have an interest in knowing what other people are doing (3) they like to engage in a wide range of social activities and (4) they like structure in their lives and would like these activities to be scheduled properly. With these core requirements in mind the first concept of 'APPointment' was created. This concept was refined with the aid of paper prototyping sessions and brief evaluations with elderly which yielded the final concept of 'APPointment'. This smartphone and tablet application allows users to plan new activities and join existing activities organized within one's own community in an orderly fashion with an easy to use interface that is adjusted to the elderly's needs. The application is supported by an interactive bulletin board located at a central point within the community. The mobile tablet application was designed for an iPad for the iOS platform. The interactive bulletin board is a browser-based application developed using HTML. This system was designed in such a way that it could not only be integrated within closed communities such as elderly homes or home care facilities, but could also be used to connect different elderly care homes or people living in the surrounding neighborhoods.

Fig. 2. Homescreen with eight categories

A paper prototype was designed and tested with participants who were above 75 years and most of them had participated in the user research sessions. We learnt that the contrast between pop-ups and the background should be substantial (more than the normal) for improving the reading quality. Second it was observed that a clear color scheme was needed so that people could relate colors with categories and recall them in a better way (see Fig. 1). Furthermore, these results indicate that a self-explanatory tutorial should be integrated under the help section. The 'help' option should be present in the application and should be visible on screen at all times. Based on these results a final working prototype was designed and developed. The final design included three major functional areas: (1) the home screen, (2) activity screens and (3) agenda screens. On the home screen, a category of activities can be selected (Fig. 2). These eight categories included amongst others shopping, eating, chatting and watching television. Touching one of these categories brings the user to the next screen where an overview of already planned activities can be found (Fig. 3). The user can choose to join an activity or create a new one within this category. The third screen includes an agenda overview of all the activities the user is planning to attend. An interactive bulletin board supports the system by establishing a central meeting point where users can meet and by showing upcoming activities and other relevant information like the weather.

The application is designed in such a way that the information conveyed by the interface itself is enough for the user to know what to do. While designing this app, special attention is paid on elderly's cognitive disabilities [6]. The structure of the application is very simple: a maximum two sub categories with a clear path to move back and an icon to go to the home screen. Large fonts, clear icons, big touch areas and a consistent color scheme were used throughout the application. The overall design is very minimalistic and only the most relevant information was presented at one time. To support the user in the navigation, a help button was integrated in every screen.
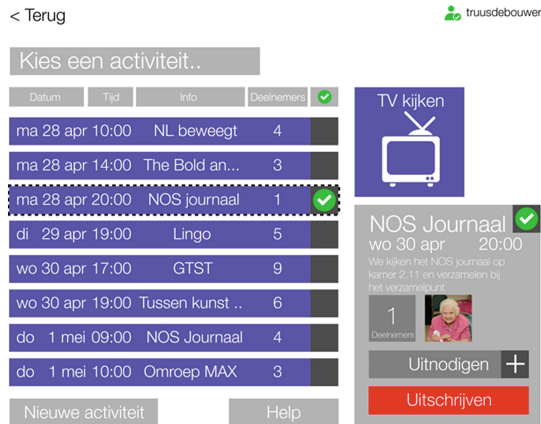
Fig. 3. Sub-screen to plan 'shopping' activities

4   Usability Evaluation

Fifteen residents of an elderly home in the age of 75–90 years old, without any severe cognitive disabilities and with very basic exposure to computers and tablets, participated in the evaluation phase. The 'APPpointment' app (both the tablet app and the interactive bulletin board) was evaluated in an elderly care home. The evaluation criteria were to (1) identify whether the usability of the application is sufficient for routine tasks, (2) do users find the app meaningful, (3) can users relate the solutions with their everyday problems of social isolation and (4) how can this app be improved both in terms of usability and new features. A task-based evaluation was conducted in which all users were asked to perform different tasks i.e. organizing new activities under different categories, joining existing activities, modifying activities and using help when stuck. Users were encouraged to think out loud during the tasks and we recorded all evaluation sessions for further analysis. Users who encountered difficulties while completing a particular task, either because of the lack of understanding or due to a usability problem, were assisted and users with a little experience with tablets were given a short tutorial.

The results indicate that the target user group found the new app accessible, efficient and most importantly quite effective in improving their social lives at the elderly care home. The results also showed that the 'APPointment' app has an understandable design with very good readability and all participants were able to understand the ecosystem of both apps. The overall concept of the app was evaluated positively and participants consider it an excellent addition to their lives especially for those times when they experience feelings of social loneliness. All participants mentioned that it was important to see what others are doing, which made it easier for them to join different activities now. They also thought that the bulletin board works as a center point and will play a major role in increasing social interaction. They also appreciated the ease with which activities could be arranged. For a future scenario, they also showed an interest in connecting the system with the outside world where other people

(both familiar and may be unfamiliar) could join in for selected activities. For example one user said, "I would like to use the app, because I know people who live in the neighborhood (of the elderly care center), that way I can meet others (outside the care home) to undertake activities". The users appreciated the fact that the app brings structure to their lives and improves their social lives without overwhelming them with different unstructured possibilities. Finally users mentioned that the app would have a positive effect on their well-being.

It was often found that the lack of experience in using tablets created a number of usability issues. A few users, especially those who had not used a tablet before, were not only afraid of using the application but also overly sensitive and careful while touching the screen. We did not see any major issue with the structure of the app or with the labels but physical interaction was sometimes slow and hampered due to no prior experience. However, the user testing showed a steep learning curve once users got familiar with the application and with use of the iPad. Therefore, we believe that a proper tutorial and guided help in the beginning can not only improve the acceptability of an application but also improve the confidence level of elderly.

5   Conclusion and Future Work

This paper discussed the design of the 'APPointment' app, an application for elderly to plan and create activities to undertake with one another in an elderly care home. This study shows that elderly are worried about the issue of social loneliness, and appreciate the intention of our application to reduce loneliness and social isolation. Based on the early results, we conclude that the 'APPointment' presents a successful and accessible design for its target audience. Unlike former studies, this study integrates a social application in an existing community to strengthen social interaction among members. By taking a user centered approach during the development and thus making elderly part of the design process, valuable information was collected which led to an increased level of usability and acceptability of the final solution. The design of the application addresses the needs of the users in such a manner that even inexperienced users were able to schedule and join events. Unlike a number of previous applications, this application focused on designing the 'app ecosystem' i.e. a tablet app and a central interactive bulletin board which proved to be much more useful and user friendly in the elderly care home context. Finally the 'APPointment' app was not only appreciated by the actual users but also by the management of elderly care homes who liked the idea and showed an interest in installing such an app on a permanent basis.

A limitation of this study is that a small number of the user tests were conducted. In future we would like to run more evaluation sessions in different elderly care home in the Netherlands. Furthermore, we would like to test this application in a nursing home where elderly with more severe cognitive disabilities live. This will help us in understanding how a more specialized user group interact with this app and how can this app be improved for such groups. Based on our limited user research, we believe that elderly with more severe disabilities also face the same problem and many existing solutions designed for 'normal' elderly can be modified and customized for the special user groups. Finally, in order to get a better understanding of the effectiveness of

'APPointment', a longitudinal study should be conducted. That study would indicate whether the usability of the user interface improves over a certain amount of time, and whether the application does actually reduce social loneliness.

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