CommunityNet: Mediating Care at the Local Community Level

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Abstract. Community care is expected to be increasingly important for seniors in need of support towards prolonged independent living and higher quality of life. Whereas people generally indicate they are willing to provide support within their community, several barriers prevent elderly people from asking for support. The present paper describes the design of CommunityNet, a social network service that aims to bring together the local community and to lower the barriers towards asking for help. Based on the findings from user research, ambient awareness displays were developed and placed in the homes of seniors and local community members. The awareness displays showed an overview of the people, their requests for help, and the status of the requests. The concept was evaluated in a field trial (n=4, 10 days). The participants indicated that they preferred using CommunityNet compared to face-to-face contact and telephone when the need for support was not urgent. According to the participants, the barriers towards asking for help were lowered by the system. As a next step, an automated match-maker mechanism will be developed which enables people to extend their care network, and the system will be tested in a range of communities.

Keywords: Independent living, community care, social network, awareness display, communication system, peer-to-peer, field trial.

1 Introduction

Many elderly people in western countries prefer to live independently as long as possible, but they need support in doing so [1, 2]. Care is nowadays generally provided by professional caregivers, by family caregivers, and by the local community. During the next decades, the number of professional caregivers per elderly person in need of care is expected to decline in Western countries. Family care and community care are thus expected to play an increasingly important role in helping the elderly to continue living independently at home.

In interviews conducted in support of this study, as detailed below, people generally indicated that they were willing to *provide* support within their local community. Several barriers however prevent people from *asking* for support. First of all, people find it hard to ask for help in a face-to-face setting, which could be caused by the higher cost of denial in a face-to-face setting compared to a mediated setting.

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Secondly, the interviews showed that elderly people in particular experience a feeling of shame towards asking neighbors for help. Thirdly, seniors indicated that they often would not know who would be the best person to approach with a specific request. In short, barriers prevent people from asking for help, even though local community members may be able and willing to provide help.

Social networking mechanisms could be used to facilitate community care. By using a social network, people could ask for help via a mediated setting, which may lower the barrier as compared to face-to-face communication. Moreover, one may expect peer-to-peer social network systems to result in less stigmatization compared to traditional monitoring systems for independent living, since elderly people would not only ask for help, but also provide help. Additionally, a social networking system could help people find the best match when asking for help.

Whereas existing social network systems, such as Google+ and Facebook, could eventually be used as a platform for community care, in the current study the decision was made to explore the user needs and further design directions using a prototype communication system that was specifically developed in support of the study goals. This paper describes the design of CommunityNet, a social network service that aims to bring together the local community and to lower the barriers towards asking for help.

2 Related Work

Existing projects related to community care vary from phone-based match-making facilities, to web-based communication tools, to closed communication systems. As an example of phone-based match-making, Burenhulpcentrale[1] uses a database of over 17000 participating households to match care requests to care providers. An automated system was used to make a match between care requests and care providers. In many cases, however, no proper match was found, or the process of entering a request and finding a provider took too long [5]. Moreover, participants found it awkward and difficult to ask strangers for support.

There are several examples of systems that aim to improve social cohesion and enhance communication within a local community. I-neighbors[2], for example, is a website that aims to connect neighbors with similar interests. I-neighbors includes discussion boards, photo sharing, directories and a forum. Whereas I-Neighbors makes it possible to search for people with shared interests living nearby, the communication mechanisms seem inappropriate for communicating individual care requests, and it is unclear if users are able to translate the virtual ties into social ties in real life [3]. Likewise, Building Bridges, is a research project which aims to help older adults remain socially connected [4] by using communication technology to link users around broadcasts including news, documentaries, stories and music. A touch screen computer was combined with a phone handset using Skype. During or after a broadcast users could chat with other listeners. Whereas elderly users appreciated the system, it seems inappropriate for communicating individual care needs.

Well-known examples of closed communication systems are the Digital Family Portrait (DFP) [5] and the CareNet Display [6]. These awareness displays provide

[1] http://www.burenhulpcentrale.nl
[2] http://www.i-neighbors.org

peace-of-mind to distant family caregivers, and can be used to better assess what care is needed at what time. Whereas DFP and CareNet Display are basic automated monitoring systems by design, there are examples of systems that enable seniors to explicitly enter requests. ShareCare ZorgSite[3], for example, is a website that is used to coordinate care within an existing care network. Email and SMS are used to automatically distribute care tasks within the network. Since the website can only be accessed through a web browser, many elderly users are unable to access the system and post requests [7, 8, 9]. Moreover, since the system is based on the paradigm in which a caretaker is surrounded by caregivers, the system by design results in stigmatization, resulting in sub-optimal product adoption.

In short, barriers prevent elderly people from asking for support using existing communication systems. The present paper describes a design case that aims to lower the barriers towards asking for help by using a social network service to bring together the local community.

3 Approach

Figure 1 below shows the user-centered design approach that was followed in the present design case. The user research, as described in section 4, aims to better understand how people experience providing and receiving care in a local community setting, and to find out what barriers are preventing community care. In the design phase, an interactive concept was iteratively developed. Prototypes were built and evaluated in the evaluation phase.

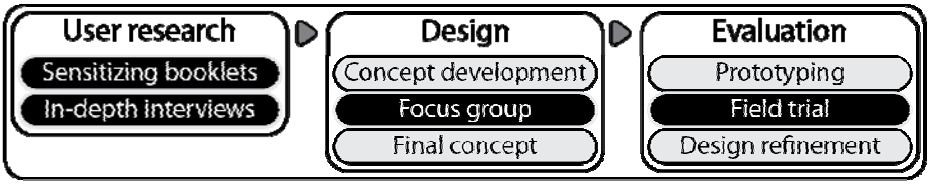

Fig. 1. A user-centered design approach was used to ensure that the interactive concept would properly address the user needs and that the concept would fit the context of use. The solid bars indicate the involvement of the user in each phase.

4 User Research and Context Analysis

Goal. User research was conducted to better understand how people approach providing and receiving care, to understand relationships with family, friends and neighbors, and to find out what barriers were preventing community care. The target group for the user research was defined as 'future seniors', i.e. people who are expected to be in need of care to continue independent living at a certain moment. The participants were two Dutch married couples and two Dutch widows, ranging from 58 to 65 years old. All of the participants held a part-time or fulltime job, and

[3] http://www.sharecare.nl

lived independently at the time of the study. Their education and computer experience levels vary.

Sensitizing Booklets. Booklets, as an element of context mapping [10], were developed to sensitize the participants for an in-depth interview on their personal and social life. The participants were asked to describe how active their social network was, how they currently receive care and what they expected in the future. The information collected from the sensitizing booklets was subsequently used as a guideline for developing the in-depth interviews. The booklets consisted of several assignments. The first assignment was to log contact moments for two days. This provided both the participants and the researchers an impression of the number of social contact moments per day. After this, a map of the social contacts was made, categorized by (a) family, (b) friends, (c) neighbors and (d) others. In the next assignments these contacts were placed on a circular map with stickers, axes meaning (a) distance (only family and friends), (b) the closeness of the relationship, (c) the expectation of these relationships for the future and (d) the experienced barrier to ask for support. The final assignment was to write down what support was provided by and received from the listed social contacts.

Interviews. Semi-structured interviews were conducted to better understand the participants' input in the sensitizing booklets, thus letting them clarify concerns about their personal situation.

Findings. In describing future care needs, the participants referred primarily to support from family and friends. The family-and-friends care network described tended to be rather small, often between 5 to 10 contacts. Since the family and friends referred to often lived nearby, most of the participants indicated they did not feel the need to build up a close relationship with neighbors in order to strengthen their care network. While the potential of the local community to strengthen the care network was mentioned, the participants indicated that they felt a barrier towards asking their neighbors for support; for example, fear of bothering or burdening their neighbors.

Based on the findings of the interviews and of the literature research, a categorized list of issues relevant for the design phase was created. Table 1 shows the list, which summarizes the explorative phase.

Table 1. Categorized issues that summarize the explorative phase, used as input in the design

Getting older	• Resistance towards new technologies (Adoption) • Difficulties with household activities • Afraid of stigmatization
Independent living	• Prefer to live independently as long as possible • Barrier towards asking for support • Don't want to give up privacy or provide personal information
Care potential	• Less care from children, more from local community • Communication systems as mediators • Self-management • Seniors are increasingly experienced in using computers (though for most seniors applications can soon become too complex)

5 Design

Based on the findings from the user research, the system should (a) avoid stigmatization, (b) include family and friends as well as neighbors, and (c) be easily-accessible and easy-to-use for people that have little experience with a computer.

Figure 2 below shows the design steps in the design phase. First, the design space was explored, and several explorative concepts were developed. The concepts were discussed in a focus group session. Based on the feedback from the participants, a final concept was created.

Fig. 2. Steps in the design phase

Since stigmatization was found to be a primary concern of the target users, the development of a peer-to-peer system was decided upon. A peer-to-peer system can be introduced before people are in need of care; users can then offer their help to other community members, and they can get used to the new device when they are still willing to adopt new technology.

Generating Concepts. The design space was explored using a series of provocative scenarios of interactions with future products.

Discussing Concepts. To understand how the target group would value potential design directions, the scenarios were discussed with the participants. Participants were asked to assess the scenarios based on (a) the barrier towards asking for support, (b) the information they would exchange through the system (c) preferred product initiative, (d) adaptation to the individual user, and (e) user motivation by the system.

Since users of all ages should be able to use the system, a variety of ways to communicate requests was explored. Ideas that were created include an application on a mobile device, an in-house product or application on a computer, or a central product in the neighborhood. Based on the discussions, creating new requests and responding to requests were considered to be the primary functions.

Elaborating Concepts. Three directions were explored: (a) a request-making product based on connecting physical objects, (b) an agenda-based request- and appointment-making product, possibly using awareness of presence, and (c) a combination of both.

Figure 3 shows three elaborated concepts. The first concept is based on connecting physical objects containing a contact, request, date or time. Seniors who experience the computer as a barrier, might be willing to and able to interact with physical objects, and thereby access the digital world through physical objects. Users can create a new request by connecting *contact* objects, *activity type* objects and a *date-time* object. The second concept combines the physical objects with an agenda on a (touch) screen. The agenda is used as a metaphor, since providing care can be seen as planning activities. The main advantage is that the user has an overview of its contacts, as well as all the appointments. In the third concept the agenda is the main functionality. An overview of contacts is shown, and requests can be entered using on-screen forms.

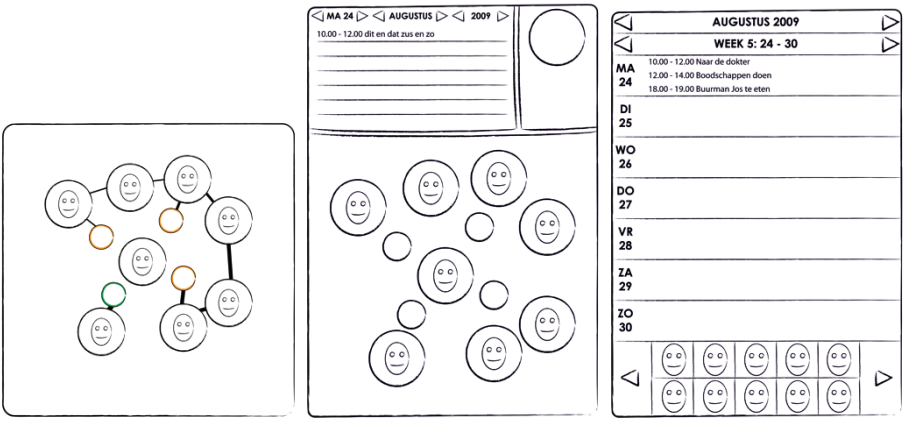

Fig. 3. Three concepts were studied: (1) Physical objects, (2) Physical objects and agenda on screen, and (3) Agenda and contacts on-screen

Focus Group Session. The three concepts were evaluated with 4 Dutch participants (1 male, 3 female participants, age 58-65) from the sensitizing booklets and interviews in a focus group session in the home of one of the participants. The project goal and the three concepts were discussed with the participants. The main findings were: (a) the participants indicated that it might be hard to set up and expand the network, since it was considered hard to approach their neighbors, (b) the participants did not want to have too many obligations in terms of supporting people with whom they do not have regular or frequent contact, providing support would depend on the urgency, frequency and expected commitment, (c) considering the concepts, the participants indicated that physical objects are difficult to keep organized, and when actively using the product there is little overview. However, the participants indicated that if the physical objects could be represented as digital elements, an overview could be kept, and the device could still be easy to use. The participants questioned whether they would use the agenda function in the device, since they usually already keep their own analog or digital agenda. The product should therefore not depend on the agenda function. Finally, regarding awareness of presence, the subjects reported that they did not want to share information about their personal life with people whom they would not frequently offer support to. If they were in need of regular support themselves, they reported that they would have no problem with providing information about their activities. However, there was a fear others would take too much of their time when they could see when they are available. Thus, in providing personal information a distinction has to be made between family and friends, and neighbors.

Final Concept. Based on the feedback from the focus group session, Concept 3 (Figure 3) was chosen as a basis for the final design, since the participants appreciated the usability and the flexibility. An interactive digital photo frame was chosen as an ambient awareness display in the living room, but that could draw attention if necessary. This method was proven to be successful in the DFP and the CareNet

Display. Presence information was not incorporated in the final concept, since the participants of the focus group session indicated that they did not want to give details about their personal life to relative strangers. The agenda function was replaced by a chronological overview of the requests, since the participants in the focus group indicated that they would not use an agenda on the device itself. An agenda function could however be synchronized with other digital agendas. Since it is unknown in advance when a request will be read, it is by nature unsuitable for emergency requests. Participants indicated that they would use the telephone or walk to the neighbor in case of an emergency.

Figure 4 shows the final concept, an ambient awareness display for community care. The user interface consists of (a) the contact area on the left side of the screen, (b) the request area and (c) the profile area on the right side of the screen. The contact area contains pictures of the user and its contacts, with request icons floating around the pictures. The user can switch between the request area and the profile area using tabs. When no picture is selected (mode a) the right side of the screen shows an overview of the appointments made. When the user selects himself/herself (mode b) an overview of the users requests is shown on the right side, with the options to add or remove a request. When a contact is selected (mode c) an overview of the contacts requests is shown on the right side, with the option to react on each request. When the user selects itself or a contact, the request icons are enlarged.

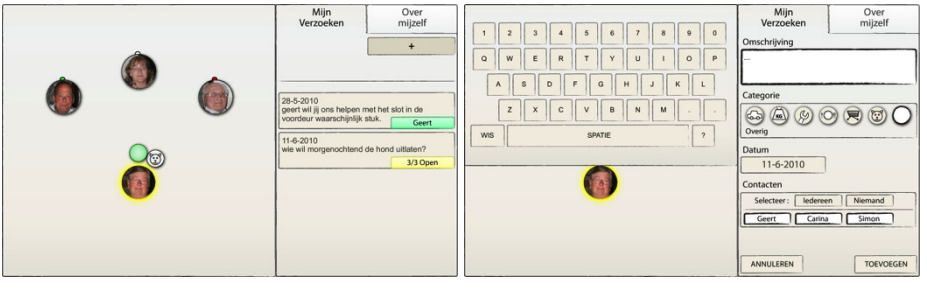

Fig. 4. In the main view (left), the user can see an overview of the request states of all pending requests. The panel on the right shows all accepted requests which are either initiated by the user, or accepted by the user. New requests can be added using the on-screen keyboard (right).

To enable quick responses and keep overview, a request can only be answered with 'yes' or 'no'. The user can select whom the request is sent to; by default all contacts are selected to stimulate users to ask as many contacts as possible for the request. Next to support requests, social requests can be placed. A distinction between support requests and social requests was made to stimulate users to also use the device for non-care-related aspects, thereby stimulating local community contact moments.

In the profile area, the user can enter his/her hobbies, interests, strengths and general support categories. Other users can search for new contacts based on these profiles, as well as on the location. This was added to stimulate users to find new contacts, and to share their interests and strengths.

6 Field Trial

Goal. A field trial was conducted in order to explore how target users use and experience the prototype system in a realistic setting, and thereby validate the design choices. A future extensive field study is needed to validate the concept.

Method. A group of 6 new Dutch participants (two married couples, a widow and a widower, age 45-93, with varying education levels and computer experience) was recruited for the field trial. They were part of an existing social network; three neighbors and a grandfather of one of them who lives close by.

First, the participants were asked to write down provided and received support in a period of 10 days. In interviews, the participants were asked to describe the relationship with the people they currently receive support from and provide support to, and if they think new communication products could be used to improve this.

Next, the prototype was placed in the homes of the participants for a period of 10 days (figure 5). During the trial the activities of the users were logged. The support activities before and during the trial were compared and discussed in exit interviews, and the participants were asked for feedback.

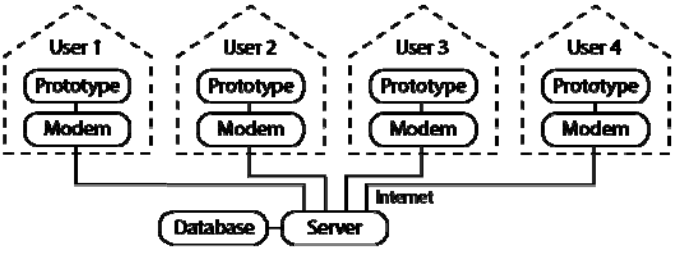

Fig. 5. Configuration of the system. Four prototypes were placed in the homes of the participants, connected through an Internet connection.

Results. Eleven requests were placed during the trial, of which only 4 lead to a match. The number of requests was in line with baseline measurement. The participants did however indicate that the perceived barrier to ask for support was lowered by the prototype, since it allowed them to ask multiple contacts for support at the same time, in a less direct way compared to face-to-face requests. They noted that they would like to have the product in their homes in the future, but only when it would be possible to have real-time contact. Requests varied from walking the dog to changing a lock. The eldest participant (93) did not place any requests, since the help that he received from his grandson was sufficient, and he preferred using the phone to contact his grandson.

The prototype was considered easy to use after it was used a couple of times. Placing a request was considered useful when it was not too urgent, since they were unsure whether they could expect a fast response. In that case phone calls were considered more adequate. The profile pages were only viewed once, and the social request function was hardly used as well. This was in line with our expectations since the participants already knew each other well. All participants indicated they would like audio feedback when a new request is received. The eldest participant would like replacing this device for the alarming device in his protected housing.

Fig. 5. One of the participants of the field trial using the prototype

Conclusions. Based on the findings from the field trial, one can conclude that a social network service could be used to lower the barriers in asking for support within a local community. Further studies are needed to quantify the effect of the service on support for a longer period of time. The field trial did however provide feedback on the design choices, which can now be used to improve the design.

The choice of a touchscreen interface was found to be successful, even though the eldest participant (93) had never used a touchscreen before. Although support requests could be made more anonymous than face-to-face contact, this appears to be useful when the request is not urgent, because of the uncertainty of response. The participants did not appreciate the option of being able to automatically send social requests to all contacts, since they did not always want to invite all of their contacts. The eldest participant (93) seemed to have problems with remembering how to use the device. This suggests that the current design may not be suitable for all ages. The feedback of the participants led to new requirements for a future version of the CommunityNet system, including audio feedback from the device itself or an e-mail or SMS notification when new requests or responses are received.

7 Conclusions

This paper presented a design case that aimed to stimulate community care using a social network with dedicated interfaces in every home. As observed during the interviews conducted, people may be willing to provide support within their community, proving the barriers are lowered in asking for support. The field trial demonstrated that a social network service could be used to lower barriers towards asking for help.

A key challenge in designing a community care system is the need to reduce stigmatization. By creating a peer-to-peer system, a community system can be introduced not only to people in acute need of care, but also to a larger group of people who in future might depend on the system. The peer-to-peer community approach enables seniors to offer their help to their neighbors, and thereby play an active role within their community. At the same time, they can get used to the new device at an age when they are still open to adopt new technology.

An interesting direction for future research would be to find mechanisms to extend social networks for community care, and to motivate people to be active participants within their network. Many seniors have rather small social networks. Social network mechanisms could be used to extend the networks, and thereby improve their means to prolong independent living.

Furthermore, it would be interesting to study how the system could be used on mobile devices. Whereas a dedicated device in the home of the elderly seems appropriate for present seniors with little computer experience, future seniors are expected to be experienced in using mobile devices. Future studies could for example focus on how to motivate seniors to offer and request support using a mobile service.

Finally, existing social network systems may be a good basis for community care in the future. A key design challenge seems to be to make these systems available to elderly users, who often have little experience with computers. A combination in which easy-to-use devices are available to seniors to access generic social network services seems a promising next step.

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