

# Designing for Social Connectedness

Exploring the case of elderly users

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For today's elderly, the theme of social wellbeing has received increased attention. Modern communication technologies increase opportunities for enhancing wellbeing by enriching remote interpersonal awareness. This project studies the phenomenon of social connectedness, being the temporary experience of belonging to a social network. The work aims to gain an understanding of role of communicating user-context information. As a first step, a measurement tool for social connectedness was developed. Secondly, artifacts will be designed to stimulate social connectedness through context-awareness. These will be evaluated using the measurement tool. Finally, a framework will be developed to describe the relationships between the types of contextual information.

*Social connectedness, context aware systems, research through design*

## 1. Introduction

In most industrialized countries, the society is progressively aging. This draws on resources for care giving, as there is more need for care, and less people to provide it. Therefore, in the last decade, there has been an increase in effort to use modern technology to support elderly in maintaining their wellbeing. (see [7] for an overview). Much of this research has focused on the physical and functional aspects of wellbeing, such as health, mobility and communication with care givers and doctor. Although it seems evident that a high level of social wellbeing positively affects overall wellbeing [10], few attempts have been made to enhance this aspect of elderly life with technology. In the current project the focus is on maintaining social wellbeing for young elderly or *healthy hermits* [6], which is roughly the age group of 65-75 years old.

When focusing on social wellbeing, several aspects can be considered, as suggested by Ormell et al. [8].

One of these aspects, belongingness, has also been identified earlier as a fundamental human need [4]. The use of modern sensor and communication technologies could facilitate this feeling of belongingness.

However, because belongingness is considered to be a long-term experience, it seems sensible to consider interventions that could enhance social connectedness. Social connectedness is considered to be a momentary affective experience of belonging [11]. As an example, one could experience social connectedness shortly after receiving an SMS message from a good friend.

Ones feelings of social connectedness can be considered to be determined by the quality (i.e. closeness and content) and quantity (i.e. the amount of social network members and amount of interactions) of social contacts. Partly, social connectedness is determined by ones awareness of ones social network, both in terms of *being in touch* as well as the feeling of *sharing* and *involvement* in experiences. The quality and quantity aspects of social connectedness are yet facilitated by modern technologies (e.g. e-mail, internet and mobile phones). Upcoming technologies such as context-aware sensor systems could help to create a natural sense

of connectedness by stimulating interpersonal awareness. We consider a system to be *context-aware* when it embodies sensors that are embedded in the natural surroundings of a user. The system should collect and interpret the data so it can be used in for example an interpersonal awareness system.

There are several studies described in literature that aim to enhance social connectedness through context-aware systems, although the use of the terms is not consistent. For example, some studies refer to social presence, rather than connectedness. Included here are studies that focus mainly on communicating the activities of the other person [7, 5]. In such cases, the communication is aimed at monitoring the elderly person to detect irregularities or cases in which help is needed. Other projects tend to focus on the communication of information from the everyday lives of the users [9, 2], arguing that the awareness of each other's everyday lives is paramount for social connectedness. Gaver [1] has suggested that the aesthetics of display and interaction with the system is an important contributor to the social connectedness it creates. In short, although studies have been conducted on the physical design of connectedness systems, the designs of the studied systems are created on a rather ad-hoc basis, and the evaluations are done in arbitrary and ambiguous ways in terms of applying validated measures of connectedness.

## 2. Research Goal and Questions

Recent studies on connectedness lack building on a clear definition of social connectedness and in the use of valid measures for the experience of social connectedness. This observation led to the development of the two main research goals for this PhD project.

**The first goal** is the development of a measurement tool for capturing the effect of designed interventions on experienced feelings of social connectedness. The tool should be able to capture the momentary nature of social connectedness. Also, as we aim to do longitudinal field studies, we will not have resources to include a large sample size. Therefore, the tool should also be suitable for small samples.

**The second goal** is to develop a framework to help designers of artifacts for connectedness in determining styles and content of communication, in specific for elderly users of such artifacts.

Towards achieving these goals, the following research questions are to be addressed:

1. How can we capture both the momentary and subjective nature of social connectedness in field intervention studies?
2. How does the communication of different types of contextual information contribute to feelings of social connectedness?
3. What is the interaction between the different types of contextual information and communication, with respect to social connectedness?

The first question will be answered in collaboration with fellow researchers from the domains of the social sciences and psychology. It embodies both the design and validation of a measurement tool. The second and third question will be addressed in field-intervention studies, following an empirical research-through-design approach [3]. The approach will be described in section 3 and 4 of this paper.

## 3. Approach and progress

In the first field study, we will focus on pairs of users that will be invited to use a designed computer-mediated-communication product. We will measure the feelings of social connectedness towards a specific

person, in this case being the co-participant. We call this type feelings *specific* social connectedness.

### 3.1. Project Outline

As context-aware systems are not commercially available, the systems used in the field studies will be designed specifically for each study. The designs will be targeted at exploring the effect of interpersonal awareness of different types of contextual information. To be able to do this, a measurement tool for social connectedness should be developed (research question 1). Then, three types of contextual information will be considered in separate intervention studies: *presence*, *user activity* and *user location* (question 2). The studies concerned with these three elements of context will contribute to a framework describing the effect of each of these factors on perceived feelings of social connectedness, while also considering the interaction between the factors (question 3). In a last series of intervention studies, designers will use the framework to design for social connectedness. These will be evaluated in the. This outline is depicted in *figure 1*.

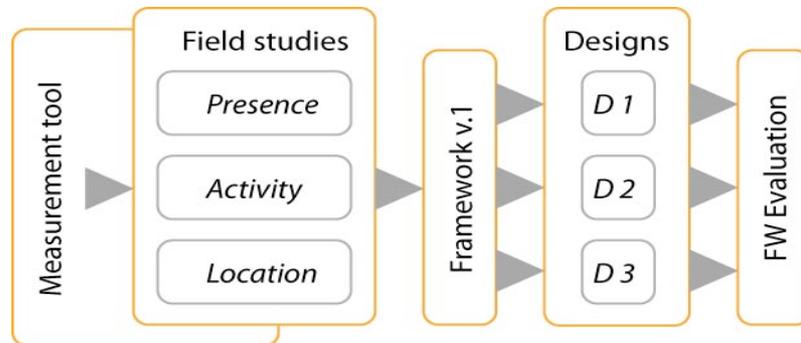


Figure 1: Project outline

### 3.2. Development of a measurement tool

The field studies will be conducted with a small user sample, being five paired user groups, consisting of an elderly person and a close relative. Post and pre-intervention questionnaires alone would most likely not provide sufficient insight into the aspects of connectedness under study, given the limited period of measurement and the sample size. Therefore, we aim for a combined qualitative/ quantitative method that supports the generalization of findings, while providing insights in the underlying motives of the users. For our first field intervention studies, we propose a measurement tool that consists of three elements: 1) A weekly subjective 40-item scale on social connectedness, 2) a daily 5-item scale and 3) a pre- and post-intervention interview. An example planning for such an intervention study can be seen in *figure 2*.

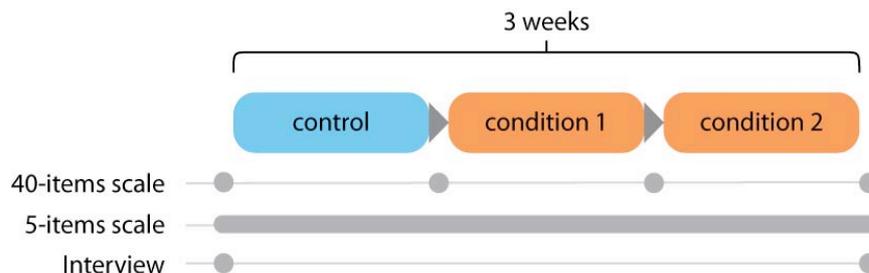


Figure 2. Overview of measurements during intervention.

The 40-items-connectedness scale originally developed by van Bel et al. [7]. The items of the daily scale are

drawn from the five factors that were found in the validation study conducted by van Bel et al [11]. The data from the daily scale enables capturing changes with a higher time sampling rate.

The interviews will be conducted to capture two aspects: underlying thoughts and feelings towards the use of the product and personal perspective on the developments of the relationship with the co-participant.

### 3.3. Field intervention study

In the field study, the aim is to have three experimental conditions (also see *figure 2*):

1. A control condition. Measurements are taken, but no actual intervention is placed
2. A first intervention condition. The intervention is placed, but only limited interaction with the device is possible, through software limitations.
3. A second intervention condition. The intervention remains, but additional interaction possibilities are added. The physical appearance is the same, but the software is changed.

The first field study is currently being set up. In this study, a product is installed that makes users aware of each other's presence in their own homes. This is achieved by displaying the amount of movement in one living room by the intensity and light pattern of a lamp in the other living room.

The objective of the first study is twofold. Firstly, the aim is to gain insight in the *presence*-type of context information in interpersonal awareness. Secondly, the aim is to evaluate and improve the measurement tool. The results of this study are expected in August 2009.

## 4. References

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