

# The Healthy Elderly: Case Studies in Persuasive Design

Koen van Turnhout, Jasper Jeurens, Martin Verhey, Pascal Wientjes, René Bakker

HAN University of Applied Sciences, Information and Communication Academy

[Koen.vanTurnhout, Jasper.Jeurens, Rene.Bakker]@HAN.nl

## ABSTRACT

Self-care and self-management are focus points in transformations in Health Care and Well-Being in The Netherlands. Citizens should live healthy and be active every day and manage their life themselves. In this context, we explore how persuasive information technology may support citizens in developing and maintaining healthy behavior. In two cases: in the Dutch cities Wijchen and Arnhem, we have designed concepts of services in co-creation with professionals and citizens. These concepts are based on persuasive guidelines and positively tested with professionals and citizens. In this paper we present these concepts and provide ideas for future work on self-care and persuasion. In particular we highlight the importance of thinking in terms of persuasion networks and experience blend.

## Author Keywords

Persuasive design, co-creation, healthy behavior, blended experience, quantified self.

## ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

## INTRODUCTION

Due to demographic changes in the Netherlands - in particular an ageing population – concerns are raised about the sustainability of the Dutch healthcare in the near future. In response, three transformations in healthcare are often proposed: a shift from *care to prevention*, a shift towards *self-orchestration* of care processes by patients and a shift from *professional to informal care*, such as provided by families [6,7]. Inspired by the growth of the mobile market and trends such as gamification [12] and the quantified self [13], we partner with health care organizations to explore the possibilities of persuasive apps and services that support and promote a healthy lifestyle.

In the past decade a substantial body of work on the topic of persuasive technology, in particular in the context of health, has emerged. Apart from ideas, put forward by Fogg [4] and Cialdini [1], designers have tried to incorporate several (predictive) psychological models such as the Theory of Planned behavior, and the Health Believe Model into the design of persuasive systems [5]. Moreover, many intervention studies have shown how often relatively short

term, targeted interventions can have positive effects on the behavior of participants.

Despite these apparent solid theoretical and empirical foundations, several authors have raised concerns about the applicability of this body of work to the design of persuasive systems [5,9,11]. Indeed, it is a non-trivial problem to translate existing theory to the design of applications that citizens will use voluntarily for a long period of time in a realistic context of use [10]. One problem is that it appears to be difficult to use the –mostly predictive- social psychological theory as generative starting point for design [5,11]. One alternative is the Persuasive System Design model by Oinas-Kukkonen et. al. [11], although quite abstract and as such it leaves much space for exploration.

We try to provide talk-back to this body of literature by executing, and critically evaluating, real-world case studies of persuasive design. We start with the challenges as put forward by stakeholders in health care who have the intention to implement the resulting applications and services. Like [9], we follow an opportunity oriented design-research approach, which centralizes the complexities of the interactions of health seeking citizens and health-providers [8,9]. In the remainder of this paper we will focus on two cases which revolved around the idea to design apps and services to persuade elderly citizens (above 50) to adopt a more active lifestyle, one with the municipality of Arnhem, the other with an health-care organization and the municipality of Wijchen. After describing the cases, we will provide a speculative discussion of our key-lessons in the project and highlight future work.

## CASE 1: HEALTH-I

### The case

Our first case was executed with the municipality of Arnhem. Arnhem, a middle-sized city in the Netherlands (150.000 inhabitants) wanted to explore the possibility to stimulate its citizens, in particular those above the age of 60, to engage more in physical exercise. This was a very open-ended project so we set up a radically iterative, co-creative project, using provocative prototypes in the 1:10:100 project setup [15]. The project quickly took a personal informatics –or quantified self - direction. Users were enabled to collect information about their own activity levels and the municipality could facilitate users who wanted to move more. A particular challenge was to find

the right functionality and tone of voice for this target group. Also, the role of the municipality as the persuader was discussed at length.

### The concept

In the Health-i concept the elderly buy a commercially available fit-bit [2] bracelet and wear it at all times to register their activity levels. A dedicated app provides users with a personal dashboard. The dashboard has four elements. First there is a daily movement monitor, which compares the movement of the elderly with the (national) movement norm. It features a tree which grows when the elderly move more, and a status bar indicating the amount of movement compared to the norm (full circle, figure 1, left). Next to this, there is a section for achievements, the current activity status of friends (thus setting a social norm) and an activity suggestion as provided by the municipality. Other screens allow the user to browse a movement history and a more extensive overview of activities in the city.



Figure 1: a screenshot of the Health-i dashboard.

### Evaluation

This project focused on the translation of the quantified-self (QS) trend to a target group which is much less tech-savvy and values achieving less than the early adopters of QS solutions. Nevertheless, it seemed quite possible to make this translation: the health-I concept was created with active involvement of the elderly and its simplicity, its lowered focus on “achievement”, and its friendly visual language resonated with them. The application seems to fill a niche between existing pedometers, and apps for running and other sports which provide social and self-monitoring features, like those provided in this concept.

During the project the role of the municipality as a persuader was downplayed (early, more provocative concepts, involved the system punishing users which did not move enough, for example). In the final concept the municipality contributes to the self-management of exercise by the elderly (by supporting the app) and by providing an overview of activities in the municipality.

## CASE 2: PROJECT MOVE

### The case

Our second case was executed with ZZG Zorggroep de Meander, a healthcare organization in Wijchen, who wanted to stimulate moving behavior of ‘young elderly’ (aging 50 years or above, in particular the usage of a brand new fitness center specifically targeting this group. Like in the first case, a co-creative project with provocative prototypes using the 1:10:100 approach [15] was used to clarify the problem definition and to find opportunities for support in the community. Within the 1:10:100 framework, Service Design [14] and the Development Oriented Triangulation framework [16,17] was used to give guidance to design and research activities. Although the health-care organization originally asked us to design an app which would convince elderly who were not engaging in exercise at all (‘the couch potatoes’) to visit the sports-centre, during the project the scope broadened to moving in general and the target group to younger elderly in general. An opportunity was found in social support for sporting elderly in general and supporting the smooth transition of one type of activity to another, for example in the case of (temporarily) decreased fitness in particular. User research showed this was one of the problems which resulted in longer periods of movement abstinence.

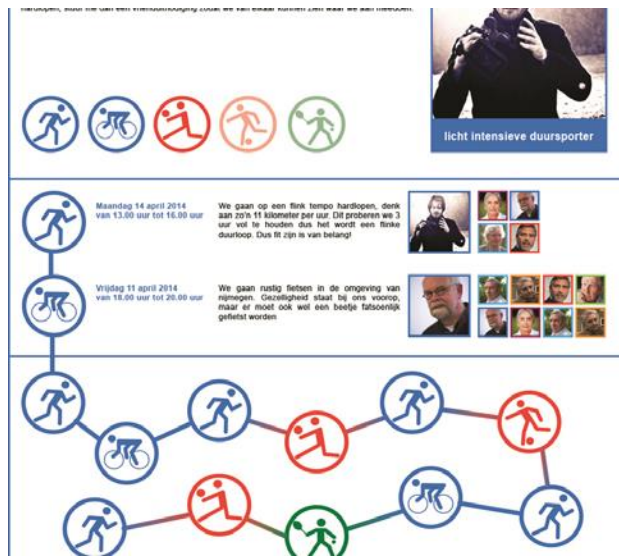


Figure 2: Screenshot of the activity calendar, showing pictures of the organizers, participants, and meta-information about the type of activities.

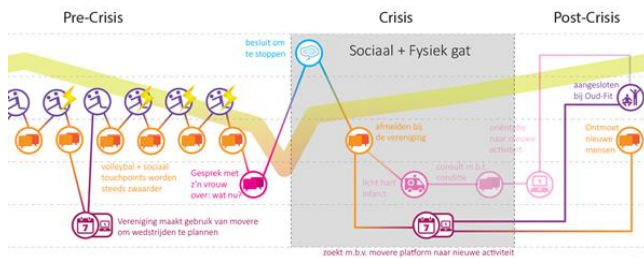
### The concept

Central in the concept is an activity calendar, which provides an open system in which anyone, including the new fitness centre, can create an activity (Figure 2). Creators are required to specify the type of the activity (for example ‘light exercise’, ‘short duration’), experts could be active in the community to make corrections to organizers. Users can subscribe to activities in the calendar and it is shown who has already subscribed with thumbnail pictures. This provides a social motivation to participate in the activity for users. When a user has participated in an activity it is shown on his ‘activity chain’ which provides a record of past movement behavior and can serve as a

conversation help when consulting a doctor. Figure 3 shows a screenshot of the “activity chain”.



**Figure 3: The personal activity chain, shows past activities in a non-normative way, and could serve in a discussion between the user and a health professional.**



**Figure 4: Customer journey depicting a scenario of a user who had to quit volleyball because of physical strain, the crisis situation is alleviated because of the activity calendar.**

Figure 4 shows how the system may support changes in movement pattern. The assumption is users already use the system when doing one type of sport. Once a crisis occurs for the user, he has alternatives at hand and can choose an alternative sport easily. A consult with a professional who also participates in the system might be an extra motivation to do so.

**Evaluation**

Like the first project substantial effort went into finding a tone of voice in the interface which was simple and empowering. It is non-trivial to find forms, which help elderly to monitor their own behavior, without targeting achievement as a value. The ‘activity chain’ is an interesting idea because it does not imply a movement norm or target, but it can still serve as a motivator.

Also in this project the role of the health-care organization as persuader was downplayed during the project. While the

original idea of the health-care organization was to stimulate citizens to come to the sports-centre which they started up, during the project they saw a more neutral role might be more effective. As anyone can participate and promote activities in the proposed platform the health care organization can be one of the voices in a network, rather than the provider and messenger at the same time.

**DISCUSSION**

Despite the sizable body of work on persuasive interfaces, designing sustainable self-care applications remains a challenge. The opportunities we find in the spaces between formal care, informal care, and self-care, and between prevention and care tie our stakeholders: end-users, health-care providers, medical staff, municipalities and system providers, together in new ways. This requires a mind shift of all stakeholders, and leads to complexities which are not sufficiently covered in the literature.

**Towards the notion of persuasion networks**

In the projects we presented in this paper we encountered a mind shift from thinking in terms of persuader and persuade to a more networked view. Our partners took a more modest role and saw opportunities in supporting the self-management of the elderly and to facilitate easy access to reliable health related information, social support from peers and initiatives in the neighborhood.

Current literature on persuasion, however, still works from the dyadic model of persuasion. Oinas-Kukkonen [11], for example, makes a distinction between 3 types of persuaders: *exogenous* persuaders, who create the technology, *endogenous* persuaders: those who give access to or distribute the interactive technology to others, and *autogenous* persuaders: the end users who adopt the technology. In a networked view on persuasion, these roles blur. In our second project the health care organization assumes all three roles – currently as creator, later as provider and at use time as user of the system-, but others play several of these roles as well.

One framework which may help in drawing a more nuanced picture might be found in Fishers’ work on meta-design and participation cultures [3] the framework allows for many roles; ,existing ones which can be mapped, or new ones which are created by the possibilities of the system of which each has its persuasive profile (see [7] for an example). Together these players and roles form a persuasion network, which can adapt to different persuasion needs of the diversity of users it may facilitate.

**Experience blend as a framework for designing persuasive experiences.**

While the existing sets of guidelines for persuasive systems [1,3,11] can provide a valuable resource in the design, certainly as a checklist guiding detailed design considerations, we found those to be less valuable in finding the right tone of voice and functionality for the

groups we were targeting. Moreover, sustainable use of these apps may strongly on the fit of the functionality, messaging and experience design of the app in the daily life of the users, which can be achieved by integration in existing social media streams [18], or existing experiences [19].

In particular the concept of *experience blend* [19] could offer a valuable way of thinking about the design of persuasive interfaces. In [19] we analyzed several ways in which novel experiences could be blended in the lives of users: experience stacks, contextualized experiences and experience bridges. In particular the idea of experience bridges turned out to be relevant for the second case in this paper, where several uses-cases needed to be connected elegantly in the concept design. Likewise the other types of experience blend may turn out to be valuable starting points to design for persuasive interfaces.

### Concluding

There are opportunities in the growing adaptation of mobile technologies to support users to stay healthy. This could relieve some of the strains of the current health-care system, provided that successful services can be designed. However, this involves designing systems that define and support a wide range of stakeholders to play a role in this shift and which can be integrated seamlessly in the life and work practices of its end-users.

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