

Designing a mobile system for coping with stress

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ABSTRACT

In the Affective Health project we explore mobile services that empowers people to monitor and understand their own stress levels vis-à-vis their everyday activities. Our design aims to create open surfaces for users to interpret, appropriate and change over time, making the look and experience of the system their own, even after it has been deployed, letting the participatory process continue where PD traditionally leaves. Here we discuss our design process and the problem of getting design input from a sensitive and hard to reach target group. We present the ways we worked around the problems, the questions that arose, and thoughts we have for our future work.

Categories and Subject Descriptors

H.5.2 [User Interfaces]: Evaluation/methodology, Graphical user interfaces (GUI), Prototyping, Screen design, User-centered design

General Terms

Management, Measurement, Design

Keywords

User empowerment, participative, stress, affective

1. INTRODUCTION

Exposure to high levels of stress, for extended periods of time, reduces the body's ability to cope or adapt to these situations leading to states of exhaustion and depression, or what is commonly known as *chronic fatigue syndrome* [1]. In the Affective Health project we explore mobile services that empowers people to monitor and understand their own stress levels vis-à-vis their everyday activities.

People concerned with their health, and in particular exposure to stressful situations, do not form a unified or co-located group, which to our understanding Participatory design has traditionally been dealing with [2]. In this case, however, we share the views expressed by this movement since the need to empower users is

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Conference '04, Month 1–2, 2004, City, State, Country.

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essentially the same. So far the design of Affective Health has not been a case of participatory design in a strict sense. The project and process does however share many of the concerns and values voiced by the participatory design movement.

One of our aims with Affective Health is to go beyond PD when involving users: We want to create open surfaces [3] for users to interpret, appropriate and change over time, making the look and experience of the software their own. When users are part of developing software in a way that empowers them to make it their own even after it has been deployed, the participatory process can continue where PD traditionally leaves.

The project started by reviewing literature on stress and consulting experts on stress medicine. During this process the strong impact that stress has on wellbeing became clear to us. We wanted feedback on how a mobile service for stress management would be used during stressful situations but were concerned with the possibility that the system might be counterproductive, contributing to the stress reaction, instead of empowering users to deal with it.

Methodologically this became a challenging issue: how would we be able to create and iteratively refine our prototypes and at the same time involve users? In this paper we present our design process and our ideas of how to proceed in the future.

2. DESIGN PROCESS

Based on the ideas of open surfaces [3] our system aims to provide users with easy to grasp visualizations of data captured from body sensors and mobile devices. When bio-data and mobile events are mirrored back to the users, the relationship between activities in the world and how they respond to them can help users create meaningful mappings between their experiences and how that affects them. Over time users will discover patterns, hidden characteristics and trends, to better understand their behavior. This in turn empowers them to take control of and cope with stressful situations, increase activities that promote their well-being, or simply change their attitude towards certain aspects of their lives, thereby reducing their negative impact.

Our way of involving users in the design process has been to let them experience early versions of the application in order to propose modifications or give comments on their experience. We have also presented the application in a more abstract form e.g. still pictures, in order to get more intuitive answers and associations that capture users' underlying reactions which are often hard to verbalize when answering predefined questions.

Wizard of Oz study: Early on in the development cycle we conducted a Wizard of Oz study to collect user feedback when the system was still incomplete (in particular we lacked appropriate

sensors) [4]. The aim of the study was to investigate the feasibility of creating a mobile service for stress monitoring and management that would not add to user's stress levels.

In this setup we conducted fictitious job interviews to the users, where a panel of three juries would ask typical hard to answer job interview questions. Two of the jury members would appear to be taking notes on their laptops, when in fact they were simulating the system by reading data from sensors – for instance a heart rate monitor – placed on the user and feeding the data to the mobile device held by the user.

The study confirmed the feasibility of our ideas and also revealed numerous design qualities that user's deemed important [4] Some qualities were probed for (such as whether the system increased their stress experience, or not, and why), others were unexpected (such as the necessity to display stress trends on the real-time interface and not just the current moment). The different design qualities resulting from the study were then carefully examined and an attempt at their integration in the next phase was made.

Lo-fi prototyping: When starting to build the interface we involved users by presenting 2D paper-models of the basic functions: time, history, heart rate, physical activity, and arousal (see Figure 1 Left). Six unprepared participants were asked to share their understanding and associations of the models.

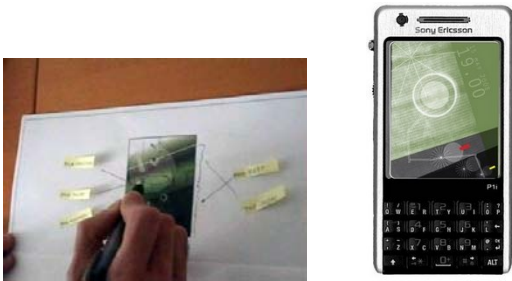


Figure 1. Left: Test with paper model. Right: The Affective Health prototype on a mobile phone.

In this way we aimed at getting a direct and intuitive reaction to different concepts for the architecture of the interface. We got feedback on how the representations could reflect their experiences, but we also learnt how people might react when being exposed to such an experiment or test.

1) Sharing personal reflections and life situation while looking and talking about the 2D picture: "My pulse is always pretty calm I guess so it must be green", "I think I'm underground a bit, so." "I'd see this as sort of a river", "I can't see the past without thinking of the now at the same time"

2) The user got stressed from not getting more information than a 2D picture, where she was supposed to "understand" different functions: "I don't understand what you are talking about" -almost refusing to look at the picture.

3) Jumping ahead: The user tried to make the designer answer questions about the future animations to understand the picture better: "I need to know what this service provides to be able to interpret these representations" . "Can you give me a clue about the animation?"

These reactions revealed some concerns that we as designers have to be aware of when involving users: the personality and the state

of mind of the participant might shape their experience and understanding of the design and the design process.

Software prototyping: Currently we are in the process of implementing a first working prototype of the system targeting mobile phones supporting the UIQ3 framework. Figure 1 Right shows a picture of the current prototype running on a mobile phone. Once the prototype is completed we plan to move on to user studies of the system in action. However, before that can happen several issues related to stability of the application have to be solved as crashes and errors are more than likely to add to user's stress levels instead of the other way around.

3. DISCUSSION

One of our concerns was the health status of our participants. It would hardly be ethical to expose clinical cases to a situation that was not designed or controlled by medical experts. Affective Health is intended to be a life-style application. Therefore users should not be made to think of it as a diagnostic tool that would bypass the necessity of professional counseling. Our choice has been to move between different kinds of user involvements, even involving ourselves, but avoiding stress diagnosed people, making gradual incremental improvements while reflecting on the process.

Our next step will be to put a prototype running on the mobile phone in the hands of users. We want the application to be a part of user's everyday life and to be used in a variety of situations. One way would be letting users document their own usage in addition to logs etc collected automatically by the application like in the in-situ-informants method [5]. We also consider giving users tasks that would put them in moderately stressing everyday situations like waiting in a really long queue, or being stuck in a traffic jam, to provide a range of sensor data.

We wish to bring our current concerns, our current design, and our current implementation to the workshop for people to experience and discuss. Our hope is that the workshop will give us ideas and insights about how to continue our work and improve on our design and design process from a participatory design perspective.

4. REFERENCES

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