Design and Test of an Office Fitness Application with the Use of Persuasive Technologies

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Abstract. In recent years a growing interest to augment the fitness level of office workers has given rise to new sets of fitness equipment and applications. This interest stems from the need to decrease the inactivity (idle time) of office workers during their daily routine and increase positive habits that may contribute to better physical health. In this paper, we echo this need and with the use of Persuasive Technologies (PT) theory we explore the design of an Office Fitness Application. The design was tested (n=31) and some initial indications are reported herein.

1   Introduction

In Denmark, 58% of the men and 54% of the women work in a sited position more than eight hours a day and every third of the Danish population does not meet the World Health Organisation's (WHO) minimum movement requirements [1]. This inactivity may lead to dangerous health problems, such as cardiovascular, circulatory disorders and type 2 diabetes [2]. On the contrary, physical activity is effective in reducing sickness absence and stress-related symptoms [3]. Now, companies increasingly recognize that the workplace plays a vital role in supporting worker health and thus bigger investments in adjustable workstations, treadmills and other office fitness equipment and motivational hardware and software apparatus etc. can be reported. Nevertheless, there are different approaches as to which strategies companies choose as intervention strategies for changing their workers fitness culture. An earlier study has found that multi-component interventions, where the company provides both education and access to the concept of adjustable work stations, can reduce workplace sitting by about 90 minutes per working day [4]. The overall findings depict that while the employees are enthusiastic at the beginning, the use of exercise tools drops relatively fast, at least for a considerable percentage of the users/employees, thus new tools and an effective motivational mechanism need to be considered [4]. To this, the potential of digital and wearable devices could provide the users with a useful tool for increasing physical activity, but it proved that the utilisation of such devices is effective only short-term (e.g. up to 3 months) [4]. Furthermore, the willingness to adopt new technology that facilitates physical activity can be attributed usually to younger users, as they are the ones that embrace new modern technology [5]. In this short paper, our focus is in OffceFit, a company that specializes in workplace fitness equipment and makes customized and systematic prevention tools for private and public organisations with elements such as

a digital platform, health checks, health presentations and evaluation courses in well-being management. The aim is to review a prototype application and suggest new features that can foster behavioural change with an emphasis on reducing sedentary behaviour.

2 Purpose

This research following the wide scope of Human-Computer Interaction [6] aims to investigate and propose guidelines for designing effective fitness applications for office training equipment, with the use of Persuasive Technology (PT). To do so a literature review, a proposition and a small scale (n=31) test were performed on volunteer users.

3 Literature Review

BJ Fogg argues that often increasing motivation is not always the solution [7]. The increasing ability (making the behaviour simpler) is the path for increasing behavioural performance. The Fogg Behaviour Model is used as a systematic way of thinking about the underlying factors that can trigger a behaviour change and they must converge at the same moment for a behaviour to occur, such as: motivation, ability, and a prompt [7]. There are three core motivations in the model pleasure/pain, hope/fear and, social acceptance/rejection. To increase a user's ability, the designer must be aware of the requirements for time, money, physical effort and social deviance [7]. As mobile phones become more context-aware, the type of trigger, in this case, must be as simple as possible to increase a user's ability to build a new routine. According to the "The Functional Triad" by BJ Fogg, one of the most effective strategies is to make the desired outcome easier to achieve by reducing a complicated activity to a few simple steps, with use of tools, social actor and medium(technology) [8]. One of the most common tools is self-monitoring, where the user is tracking the performance with simple descriptive statistics. This refers to an internal state where one might get a sense of being self-organized, and voluntary [8]. Another significant factor is social influence and comparison, which can motivate and persuade people to behavioural change by working together instead of working alone, or by comparing their performance with the performance of others. Additionally, the Persuasive System Design framework by Oinas-Kukkonen and Harjumaa is used in the process of evaluating and analyzing the persuasion context and the design principles are used to choose the kind of content and software functionality, that may be found at the final product [9]. The twenty-eight design guidelines are categorized in primary task, dialogue, system credibility, and social support categories which is mostly based on Fogg Behavior Model [10]. The most central theories and principles to consider are self-monitoring, similarity, reduction, competition, cooperation, social facilitation and social comparison [10]. The aforementioned elements were considered as part of the fitness application design, as it will be explained in the following sections.

4 Methods

The study is following the six steps of Design Science Research, and use a mix-methods research design, i.e., a combination of qualitative and quantitative data collection techniques and analytical procedures. The first phase starting with semi-structured interviews with five different users to collect user requirements and get a deep understanding of the use context. The following type of questions was asked doing the interview: Questions about existing behaviour and daily environment, and personal motivation for using fitness equipment. Followed by questions regarding persuasive design tools such as; rewards, reminders, suggestions, competition and social comparison. In addition, an expert interview was made with a UI-design stakeholder in order to collect design requirements. Finally, the artefact is tested and evaluated with the usability framework USE, Questionnaire: Usefulness, satisfaction, ease of use [11]. The choice to utilise USE was based on its four dimensions of usabilty that can be applied to various scenarios, with reported reliability and validity [11]. Users also appear to have a good sense of what is usable and what is not, and can apply their internal metrics across domains [11].

5 Results

The digital artefact proposed (a mobile application supplementing office fitness equipment) has two core features. The first feature is to connect with exercise equipment and track one's own activity. It is our understanding, that this feature will be highly valued because the users reported that they want to change the behaviour reflecting on individual reasons (e.g, increased energy level, weight loss) and additionally, it is a persuasive design tool that is appropriate and well utilised in similar applications. The application's dashboard can be seen on Fig. 1. From the left, we see the dashboard with the descriptive statistics about the user's own activity, and the ability to record and report the user's activity is shown.
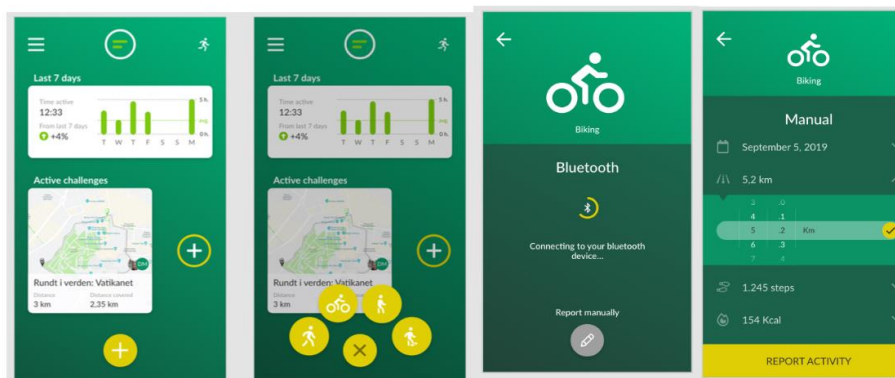

Fig. 1. The Office fit prototype – Self-monitoring of physical activity.

The second feature in Fig. 2, provides the ability to the user to create and participate in a challenge together with other colleagues. The user will be able to see themselves and other competitors on a map when they press start. The challenges can be either company-specific, bike, walk or stand related. Furthermore, the user can compete as an individual or in a team against other teams. This feature is supposed to leverage human beings' natural drive to cooperate via achieving the challenges together. Users may also be influenced by normative influence (i.e. peer pressure) as a consequence of the pressure of achieving one's own part of the challenge.
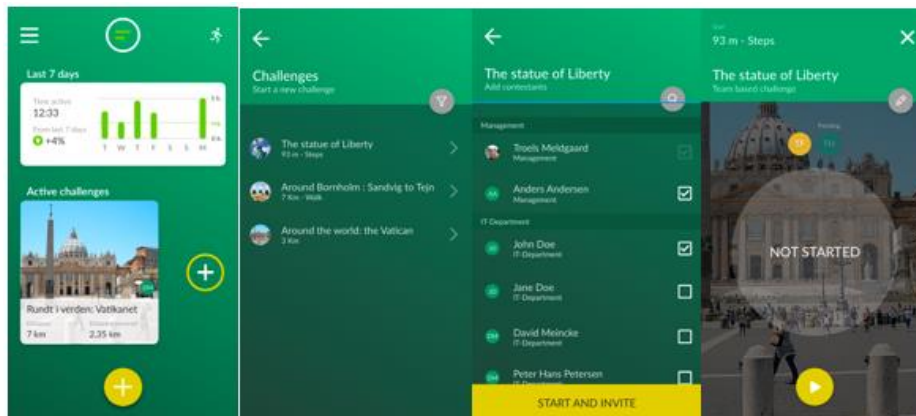

Fig. 2. The OfficeFit prototype - Creation of a Group Challenge

The users portrayed the application as intuitive, focused and simpler than the previous version, as depicted in the usability test results. On the contrary, some complexity was also reported, i.e., the existence of two plus icons on the dashboard (seen in Fig.1) and some missing information and text on the different screens. Nevertheless, the overall satisfaction was on average 5.2 on a seven to one scale and the majority reported: "It saves me time when I use it" got 5,8 on average and "I will use this version more often than before" 5,43 on average. A future improvement step will be to realise a feature in the application so as the user to be able to select all colleagues and invite them to participate in a challenge.

6   Conclusions

With the use of the two PS strategy's simplicity (ability) and social interaction, an artefact is developed to reduce sedentary behaviour and inactivity while working. When the application has to be used several times doing a workday, the most important features are, according to the users, to make the ability to track the activity fast and easy. Followed by the ability to create and participate in a challenge that supports the community at work. The artefact has shown a higher degree of satisfaction, yet further research is required to find the right combination of features.

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