

SOFA: An Online Social Network for Engaging and Motivating Families to Adopt a Healthy Lifestyle

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ABSTRACT

Overweight and obesity have become a global epidemic and are increasing rapidly. Previous research has shown that providing social support and family support has profound roles on the weight management of individuals. However, the support provided by online health communities is outside the family context and is targeted at individuals. We are proposing SOFA (*Social Family*), an online social networking system aimed to engage and motivate families to adopt a healthy lifestyle through exposure to educational information on diet exercise and a range of other healthy living information. In this paper, we describe SOFA's features, the research questions that we are investigating and some preliminary results from a live deployment. The results showed that adding a social layer can considerably increase user engagement with static educational content and showed that the provision of family based profiles reduced the activity levels of individual family members when compared to those with individual profiles.

Author Keywords

Social Networks, User Engagement, Family Health Care

INTRODUCTION

Overweight and obesity are risk factors for many diseases including heart disease, diabetes, stroke, high blood cholesterol and some cancers, and have become a global epidemic, with over 1.6 billion overweight adults worldwide (WHO, 2005). An increasing number of health care professionals and researchers have recognised the profound role of families on the health of individuals in recent years and have studied the effect of supporting and strengthening the family's role in health promotion and disease prevention (Doherty, 2004).

In adopting a healthy lifestyle, people often suffer from lack of engagement and motivation to change their diet or exercise plan. Persuasive applications can potentially support them and increase their engagement. Persuasive applications are defined as "interactive computing systems designed to change people's attributes or behaviors" (Fogg, 2003). A system that aims at providing

motivational support to influence one's attitude or behavior towards adopting a healthier lifestyle is a good example of a persuasive application. Providing social support and transparency has been categorised as one of the main features that a persuasive application should provide (Oinas-Kukkonen et al., 2008), as people are more motivated to perform a target behavior, if they observe others performing the same behavior. Clinical studies have shown that social support has consistently been related to an increase in physical activity (Treiber et al., 1991). In persuasive technology literature, a lot of research has been done on social network websites and their persuasive patterns (Rosenfeld, 2008; Plonderer et al., 2008). These websites provide all the required steps for social learning to occur. Each individual in the social network can act as a persuader and be persuaded at the same time. Friendship social networks such as Facebook have provided HCI and CSCW researchers with an opportunity to study the cues that result in behavior change (Rosenfeld, 2008).

Other studies have looked at passion-centric social networks such as bodybuilders (Plonderer et al., 2008), which connect people with no previous offline connections. In these cases the connection depends on activities related to a shared passion rather than an off-line relationship. Social networks in the domain of healthy living are a form of passion centric network, where people may not know each other off-line. There are some social networks in the context of health, e.g. (Patients Like Me, <http://www.patientslikeme.com/>), where patients can share their experience, find similar patients and learn from others. This support, however, is outside the family context and is designed for individuals. In addition, most of the online health communities focus only on providing emotional support and helping individuals cope with stress.

Many studies of online collaboration have been conducted in the context of online communities and/or educational settings; however none have been done within the family context. To address this issue, in our previous work (Colineau et al., 2009), we collected, through an online survey, information about the needs of overweight people and what they would find useful for them and their family. This provided us with initial requirements to build an online family-based interactive portal that can support a family working together towards adopting a healthy lifestyle.

Our goal in this follow on paper is to explore the effect of providing a social networking layer on top of health-related content in order to increase the engagement of the participants with the content and social network itself. In this paper, we propose SOFA, a social network for families. It aims to engage and motivate families to adopt a healthy lifestyle. We describe the tool and the research questions in the next two sections followed by some preliminary results obtained from a user study conducted in July 2009 involving 227 users. We conclude by detailing the future work.

SOFA

SOFA is a family-oriented social networking tool, which aims at providing motivational and emotional support to influence families' attitude and behavior towards adopting a healthy lifestyle by exposing them to healthy living related content. Unlike the existing social networks targeting individual users, SOFA aims at engaging the whole family who would like to learn about healthy living or make any changes to their lifestyle.

The SOFA system has a static content-based component and a dynamic social networking component. The static component consists of scientifically validated information on diet and lifestyle taken from the CSIRO's Total Well-being Diet book (Noakes & Clifton, 2005) and other health-related websites. It provides a key access point to health related resources on diet, recipes, exercises, quizzes, and other health-related links.

Like other social networks, SOFA provides social support features and consists of three core areas: A *Home* page, a users' *Profile* page, and a discussion *Forum* area has a separate function. The *Profile* page provides users with an environment where they can contribute content in order to portray and represent themselves to others using the website. These features include a blog editor which they can update on a daily basis, an activity diary which can be used to report their daily food intake and physical activities performed and an image gallery for posting photos and a message board or Wall as it is known in SOFA.

The *Home* page (Figure 1) provides users with summary information pertaining to the activities of others. These include the social networking activities such as friending, commenting, blogging, completing quizzes and forum input as well as the physical activities of users as reported in the activity diaries. Unique to SOFA is the inclusion of browsing activity of community members within the healthy lifestyle content. Users are aware of popular content and access pages recently browsed by others in a single click. The home page also provides easy access to the profile pages of other community members and details of system defined tasks.

The *Forum* page provides users with a platform for social support from community members on which they can discuss/share information. It was the intention of the forum that the discussions should centre around healthy lifestyle and that users could ask questions, provide support, seek advice and discuss different ideas and

thoughts with the community at large. We seeded the forum with sample relevant threads to encourage this.

AIMS AND EXPERIMENTAL DESIGN

The overall aim of the larger research being carried out by our group focuses on developing online and mobile technology to encourage changes in diet and lifestyle. Traditional diet and lifestyle content has been static and primarily in book format. The aim of this study is to examine the effects of incorporating popular social technology to digital health and lifestyle content and to examine the effects of such integrations.

In this study we are investigating two research questions. The first question investigates whether users of a healthy living social networking system will engage with a layer of underlying educational content. We look at whether users' interaction with SOFA indicates interest in the social networking component itself, or both the social networking component and the content by comparing the amount of user interaction with the social networking features and the amount of interaction with healthy living resources.

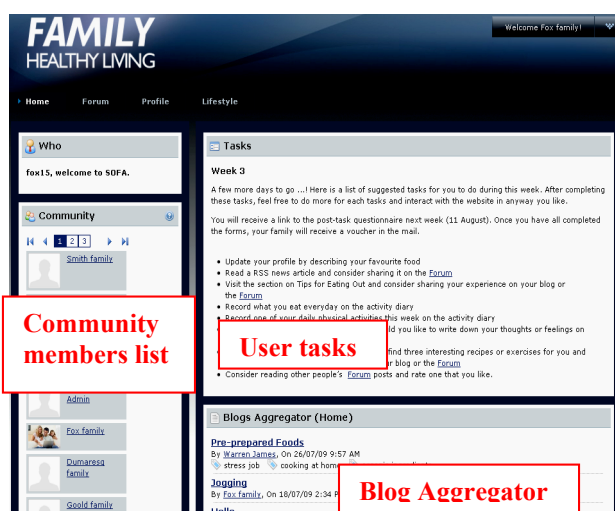


Figure 1. Screenshot of the Home Page

The second question pertains to the representation of family members within a family based social networking system. We implemented two representations of user profiles in SOFA, individual and family based profiles. In the former representation, each family member has their own profile and is seen on the network as an individual, whereas in the latter, each family has a single profile which each member can access but this profile is seen on the network as a single family, rather than separate individuals. Our second question investigates which representation of these profiles (families represented as a set of individuals or as a whole, see Figure 2) results in higher engagement with SOFA.

To measure the user engagement, we used the approach proposed by Cheng and Vassileva (2005). In interacting with SOFA, the users can perform 14 main activities, shown in Table 1. The number of times a user performs an activity i is denoted by V_i . Since the importance of the activities varies, weights W_i are introduced to describe the activities.

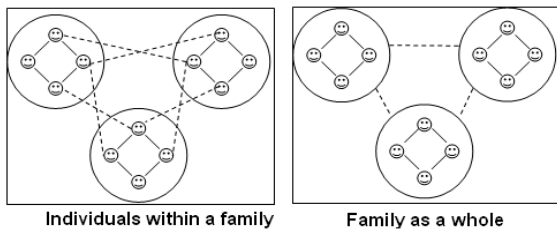


Figure 2. Family and Individual representation.

Importance can be conveyed in two ways. In Cheng and Vassileva's work they deem important actions as ones which are likely to spark further engagement by generating further contributions from others. Similarly in work by Farzan et al. (2008) a similar justification is to class actions which require user effort and work as important as they show that users were engaged sufficiently with the system to carry out the work required. A social network cannot survive without users constantly contributing new content; hence contribution has been given more weight than consumption. According to these definitions of importance, we set the values of the weights in Table 1.

i	Activities	W_i
1	Login	1
2	View forum posts	1
3	View blog entries	1
4	View profile	1
5	View Home-page	1
6	View Total Wellbeing Diet content	1
7	Write blog entry	2
8	Complete quiz	2
9	Update activity diary	3
10	Rate blog or forum messages	3
11	Provide food preference information	3
12	Write wall messages	3
13	Update profile	3
14	Write forum message	5

Table 1. Different weights for user activities.

Since posting new message to the group forum require explicit work and are likely to generate new posts by others we give it more weight. Similarly updating blog and profiles, writing wall messages and rating are also considered important, as they require work and may also result in more engagement from other users (and the person who provided the content in the first place), but they are not as important as posting messages on the group forum. An overall measurement of an individual's engagement " V_{oe} " is calculated using the following formula:

$$V_{oe} = \sum_{i=1}^{14} W_i * V_i \quad (1)$$

By increasing the level of engagement of families, we expect them to potentially change their attitude towards their lifestyle, looking at healthy lifestyle in a more positive way, and potentially help them start to take action and change their diet and exercise habit behavior. Change in attitude was measured through a questionnaire at the beginning and end of the study, designed using Health Locus of Control scale (Wallston et al., 1978).

USER STUDY & PRELIMINARY RESULTS

A user study was conducted for a period of three weeks from 18th July 2009 to 8th August 2009. We recruited 384 individuals (96 families of four residing together) across Australia. We distributed a call for participation which pointed potential participants to a screening website. The participants were required to have basic knowledge of computers and Internet and have previously used social networks or be familiar with how they work. The participants interacted with the website during the study and we recorded all their interactions. Half of the families recruited were assigned to family based profiles, the other with the more traditional individual profiles.

We sent out reminders by email every five days to encourage participants to use the website. The reminders included some statistics on the usage of the website, number of active participants and some quotes the participants had left on the forum and blogs

In this paper we present the initial results of the study. 227 participants actively used our website for the period of three weeks. Figure 3 shows the most popular features of the website, averaged over all the participants. Lifestyle and quizzes were the health-related content and the rest were social networking features. In response to our first research question we examined the amount of activity recorded on both the social networking layer and the educational content layer of SOFA across all participants. Overall 63% of user interaction system was with the social layer compared with 37% interaction with the static content, showing that social features of SOFA are valuable and attractive for the users while the content layer which is not usually found in a social networking system attracted significant attention.

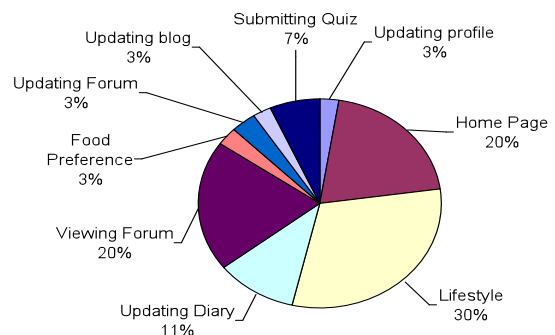


Figure 3. Average user interaction with SOFA

In particular we saw that users spent a large amount of time contributing and viewing the discussion forum where community members supported each other through their experiences. It is worth noting that 93% of forum

posts included references to the underlying content showing that the social networking layer provided an ideal platform for users to discuss the information that they had uncovered.

To investigate our second question we compared the percentage of each family active with the system in families represented as individuals in comparison with those represented with a family profile, shown in Figure 4. The results show that 71.4% of families where members were represented as individuals had more than one active as opposed to 43.9% when families were represented with a single profile. We also see that 32% of families which were given individual profiles had 4 active members in comparison to only 28% in the family representation. It shows that individual profile representation increases the chance of multiple family members participating.

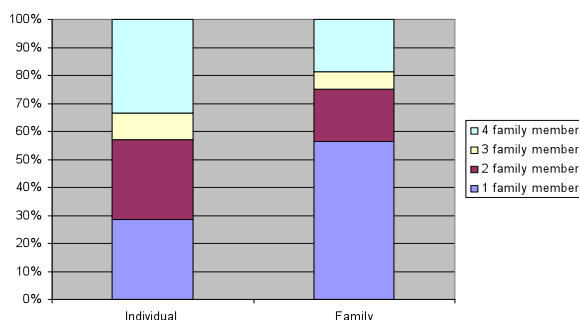


Figure 4. Percentage of active family members

We also calculated the average engagement scores of the participants (as calculated using Eqn 1). Families represented as individuals had an average engagement score of 149.9 versus a much reduced engagement level of 57.7 for those represented by a family profile. We have therefore shown that individual profile representation can increase user engagement with the system compared with shared family profile.

Overall the SOFA system was well received with several positive comments recorded in both the post questionnaire and in the forum and blogs for example:

"Since I have been on the healthy diets and walks I have lost 2kgs in 2 weeks and I can feel the difference. I am more motivated and wanting to lose more!"

"A BIG THANK YOU - I just wanted to thank everyone who participated on these blogs for their brilliant ideas. Not just for the ideas but it helped me motivate my family knowing that there was so many other people out there taking an active role also.... Cheers and Thanks... I had fun, definitely be back. "

"I have really enjoyed (and still am) this website & forum so far. I feel great admiration for the creators for providing such a site for caring and concerned people with the status of their health and wellbeing."

CONCLUSIONS AND FUTURE WORK

The results show that adding a social layer to static educational content (in this case health-related) can add a

lot of value to the whole system. It also shows that individual profile representation increases the chance of multiple family members participating and results in more engagement with the system. As part of future work, we will analyse the questionnaires to find out what participants thought about our system. We will look at the engagement of participants in both family vs individual profiles conditions and examine whether the users who were more engaged with SOFA had a more positive attitude towards healthy lifestyle. We will also look at personalising the content and presenting it based on user preferences and their interaction with the website.

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