Engaging Families in Sustainable Healthy Living

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ABSTRACT
As obesity is increasing in many countries, helping people manage their weight has become an important issue. Medical research has shown that the family context may be important to promote lifestyle changes. Our work aims at designing a collaborative and interactive environment to engage a family in support of an individual needing to manage his or her weight.

Author Keywords
Family Engagement; Tailored Information; Weight Management Portal

ACM Classification Keywords
H.5.3. Group and Organization Interfaces: Web-based interaction, Computer-supported cooperative work.

INTRODUCTION

As obesity is increasing in many countries, helping people manage their weight has become an important issue. During the last decade, there has been a lot of work investigating the impact of individually tailored health education material (e.g., [3], [5]). These studies showed that computer-tailored health interventions are promising [10]. They have the potential to reach large and diverse populations, and they produce material that is more likely to be read, remembered, saved, discussed with others and considered as interesting [4]. As a result of these studies, effort has been invested in providing people with a tailored information product such as a personal letter or newsletter.

However, the provision of an information product to help individuals manage their weight is not enough. Computer-assisted technologies are "*tools that cannot do much if individuals cannot motivate themselves to take advantage of what they have to offer*" [1]. In the context of weight management and healthy living, sometimes it can be difficult for people to control their weight (e.g., lack of motivation, low self-efficacy), in particular, when they are the only one to do so in their immediate context (e.g., at home, at work, within the circle of their friends).

A number of studies have reported on the importance of social support, and medical research suggests the involvement of family members as a way to increase the effectiveness of weight control and maintenance interventions [12]. Furthermore, in recent years, technology has advanced considerably to enable collaborative activities and support social networks in a cost-effective way, and these have been widely accepted. Taking all this into account, we are tackling the obesity problem as a collaborative activity *within the family context.*

Our work aims at developing an interactive family-based environment to evaluate the best way of successfully involving the family in a sustainable healthy living. The portal will allow us to conduct studies involving real users and investigate how family context and family engagement strategies may support an overweight individual in managing his or her weight.

ENGAGING FAMILIES

Health promotion programmes tried in the past show that influencing behaviour is a difficult task, rendered even more difficult when dealing not just with individuals but with families. Families are complex entities, each member playing a role, potentially influencing other family members but without necessarily having the ability to control their behaviour [6]. As a result, it is difficult to know to which family member the intervention should be targeted. Nutrition interventions in particular have been directed to almost all family members involving various family strategies with mixed success.

Mothers have been particularly targeted by researchers. Often in charge of the shopping and the cooking, they are perceived as the one responsible for the family diet, and thus, able to influence the family behaviour. However, findings (e.g., [13]) suggest that while fathers do not take an active part in the family diet, their preferences are taken into account, and they seem to play an important role in the decision making.

Children and adolescents, also often considered as being able to influence the whole family, have been targeted

through school-based interventions. However, Perry *et al.* [14] showed that, while school-based programmes can help students gain knowledge, they do not lead to durable changes. The parental involvement is necessary to lead to behavioural changes. This supports the general agreement that parents "*serve important health-related roles for their children as models of appropriate behaviour*" [14].

More recently, De Bourdeaudhuij *et al.* [7] have examined the relative merit of a family-based intervention (e.g., one adult and one adolescent) *versus* an individual-based intervention (i.e., either one adult or one adolescent). They concluded that there was not enough evidence to support the superiority of the family-based intervention, but also argued that the *family dimension* may have been too weak, that is, having only one of the adults and one of the children might not be enough. These studies provide important evidence and motivate our study hypothesising that it is important to engage the *whole* family in the implementation and the maintenance of such programmes to ensure the adoption of healthy habits by the family.

RESEARCH QUESTIONS

Our aim is to build an environment that can support a family, to work together towards a shared goal - that of helping a family member lose weight, and more generally adopt a healthier lifestyle. More specifically, it aims at:

- Providing information and services about healthy living tailored to the needs and preferences of overweight individuals and their families. These services might include providing feedback or encouragement, reminding, recommending, informing or advising. In this context, tailoring services means deciding who is going to receive them, how often, under which conditions, etc.
- Designing a collaborative and interactive environment where these services will be provided. We would like this environment to be a place that engages and involves the family in support of an individual needing to manage his or her weight.

This involves issues of both tailoring and collaboration. On the one hand, the environment should be capable of providing information about weight management and healthy living, such that the information will be tailored according to the individual's physical and emotional characteristics. On the other hand, the environment also needs to engage the whole family, understand individuals' goals and barriers to change, increase motivation and encouragement among family members, and adapt to family dynamics. In the rest of this section we will elaborate on the above questions.

Engagement of the whole family

We know that family engagement in weight management is important. How can a collaborative environment encourage all members of a family to take part in a weight management program? How can this engagement happen if only one individual needs to lose weight, and the engagement of other family members is only to support that individual? This differs from other typical collaboration settings where all individuals may share the same goal. Addressing this issue implies understanding individual barriers, reluctance to change, self-efficacy (confidence in one's own ability) and individual motivations. We believe that we need to ensure that each family member sees some benefit in participating and that there is ownership from all family members (i.e., each member takes an active role and knows how he or she is contributing).

Establishment and accomplishment of a common set of goals

It is generally accepted that collaboration occurs when there are shared goals. If only one individual needs to lose weight, the common goal is not as clear as in collaborative problem solving tasks or educational settings. How do we facilitate the joint development of a set of common goals and directions for the family? How do we assist the family in working together towards these goals? Individuals are also likely to have their own goals. How do we manage individual and family goals?

Collaborative relationship amongst family members

Essentially, the family needs to form a team. They all need to be motivated and committed to achieve something together. With a team come the issues of responsibilities and togetherness: how do we ensure that responsibilities are shared amongst the family members, taking into account their different roles (place in the family), commitments to the goals, abilities, strengths, and weaknesses? How can we exploit the abilities, expertise, and strengths of each family member? How can we sustain the engagement and team effort? While these types of questions must be addressed for any team work and online communities (e.g., individuals always have their own expertise, experience and strengths), considering the family unit as a team has other specific characteristics. For example, family members are not peers in the usual sense, and they are not connected in the same way as online communities (which typically implies that each member opted to be in the community) or educational settings where students are all in the same course and often at the same stage of learning.

Online communication and participation

Finding cost-effective ways to engage the whole family is an issue. Two problems that are widely recognised are the recruitment of parents and the ability to maintain their participation throughout health programmes. Most common intervention strategies (e.g., education classes), while useful, are not effective enough in reaching most parents and preventing them from dropping out. We want to explore the possibility of taking advantage of technology innovations that enable people to share information, build relationships, communicate and develop communities of interest to form part of a solution. There has been recently a growing interest in developing internet-based weight management interventions both for their potential and

appealing convenience and flexibility in reaching people (i.e., increasing the scope and impact of health promotion programmes), and for the facility they provide in automatically collecting data (e.g., [8], [15]). Despite encouraging reports of the efficacy of such programmes and the perceived usefulness of the material provided, we are still facing limited website engagement [11]. On its own, the use of technology innovation is not sufficient to motivate people to take advantage of what it has to offer and to actively engage them. Family members clearly communicate and perform activities outside an online environment. We would like the online environment in support of weight management to be a place for information posting, gathering and provision, and togetherness (for example, showing the shared goals and progress towards these goals, or celebrating successes). Can the same techniques employed in online communities and educational settings be used in the family context and to what degree?

Family Modelling

The provision of tailored information and services to individuals and families requires accurate modelling of their preferences and needs. While a lot of work has been done on modelling individuals, relatively little work has been done on modelling groups of individuals, or families [9]. What are the appropriate strategies for combining several individual models into a single family model? Often, preferences of certain individuals are more important than of others. For example, the preferences and needs of the individual in need to control his or her weight may be more important to fulfil. How can the importance of individual models be projected onto the family model? Finally, how can the provided services be tailored to the family model?

METHODOLOGY AND INITIAL RESULTS

We started investigating these issues in two ways. On the one hand, we have developed user scenarios with personas to brainstorm on what we envisage a desired IT environment to provide [2]. This is used to develop mock-ups that we will present to test users for feedback. On the other hand, we have conducted an exploratory study aimed at collecting information about the needs of overweight people, and what they would find useful for them and their family.

The study was designed to inform us on the requirements for a family weight management portal to drive its development. Based on the result of this survey, we learned that individuals and their families would be happy to use such a portal on a weekly basis. They would like this portal to be a place for the family to share (i.e., the family space), while providing privacy to individuals (i.e., individual space). They would prefer this space to be restricted to their family (no friends or relatives allowed). Nutrition information, how to read nutrition labels and recipes is of interest to them, as well as ways of engaging their family and exercise activities. We also learnt that they would prefer for most of the services to be delivered to themselves and their family. Finally, we found that people would be willing to disclose personal information to get content tailored to them. While some results are clearly supported by a large majority of participants, others show diverse opinions and attitudes advocating the need for tailoring tools that can address the needs and preferences of individuals and families.

Our current work aims at developing an initial version of the family portal to determine people's real behaviour as opposed to their preferences, and evaluate the best way of successfully involving the family in a healthy living programme. We are also exploring different family engagement strategies looking at determinants shown as influencing people's motivation, and testing them in the family context.

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Nathalie Colineau

Dr Nathalie Colineau is a senior researcher at CSIRO – Information and Communication Technology (ICT) Centre, Sydney (Australia). (CSIRO is the Commonwealth Scientific and Industrial Research Organisation, the national research institute in Australia.). Her work is at the intersection of User Modelling, Human-Computer Interaction and Language Technology. She is interested in the design and development of technology that delivers people with the information they need, tailored to their tasks and contexts. Nathalie is particularly interested in improving the way people interact with information. As needs are becoming more complex, providing them with information to support their decision making may require retrieving, filtering, aggregating, summarising, and deriving information, thus, raising issues such as trust, relevance, appropriateness and accuracy of information. She has been involved in various projects concerning Human-Computer Interaction and Language Technology, contributing to design decisions, problem solving, and evaluations.

Cécile Paris

Dr Cécile Paris is a Principal Senior Research Scientist and the Science Leader for Human Information Interaction at CSIRO/Information and Communication Technology (ICT) Centre. Her main research interests lie in the areas of Language Technology, User Modelling and Human-Computer Interaction. She is particularly interested in flexible and tailored information delivery, automatically generating coherent presentations (both multi-sentential texts and in the context of dialogues, language and multi-modal) or summaries that are optimally informative for their intended users, given the users' level of domain knowledge, their tasks, their goals, etc. An important focus of her research addresses the practicality of information delivery systems, by looking for ways to automate the acquisition of the various resources that a system requires or using statistical techniques. More generally, she is interested in combating information overload and assisting people with their information needs, in facilitating communication with information spaces and in understanding how people communicate.

Shlomo Berkovsky

Dr Shlomo Berkovsky is a research scientist, at the CSIRO Tasmanian ICT Centre. Shlomo Berkovsky graduated from the University of Haifa, where his research focused on mediation of user models in personalisation systems. Currently, he is working on a personalised delivery of health information. His research interests also include ubiquitous user modelling, group modelling, acquisition of user models in virtual and physical environments, mobile and context-aware personalisation, personalised content generation and delivery, and application of machine learning and data mining techniques in user modelling and personalisation systems. He co-organised a series of workshops on Ubiquitous User Modelling.