Wellness Interventions and HCI: Theory, Practice, and Technology

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ABSTRACT

In recent years, we have seen an explosion of wellness interventions and technology applications focused on human's wellness with the intention of helping people avoid needing medical care. Given the increasing emergence of wellness applications, there is a need to integrate existing diverse research endeavors and discuss key challenges and opportunities for next generation wellness interventions and applications. We therefore conducted a workshop that brought together researchers and practitioners in the wellness field to develop a shared understanding of existing approaches and findings around the wellness interventions and applications and identify key synergies, opportunities, and challenges for future research that lead to successful wellbeing.

Keywords

Wellness, interventions, applications, health promotion, preventive care, informatics

1. INTRODUCTION

The emerging well-being applications market has noticeably increased in the last five years. Applications for wellness interventions, well-being and healthy living include systems for encouraging physical activity [1,2], healthy diet [3], and self-regulation of emotions [4]. Also, various wellness interventions have been created using a range of technology such as social computing and ubiquitous computing [5,6]. Given the increasing emergence of wellness interventions and applications, there is a need to integrate existing diverse research endeavors and discuss key HCI issues and opportunities for designing the next generation of wellness interventions and applications.

Although the difference between wellness and health is diffuse and a matter of discussion, it is generally accepted that wellness is focused on the promotion or maintenance of good health rather than the correction of poor health [5]. In this sense, wellness applications are different from health applications that typically focus on treatment or management of disease. Instead, wellness applications aim to keep individuals healthy by helping to avoid unhealthy behavior or unnecessary exposure to unhealthy environments, monitoring the personal health state while indicating changes. This distinctive aspect of wellness applications impose new questions and challenges to researchers in various fields of wellness, including HCI, preventive care, health promotion, and psychology: How do we design a system that aims to promote individuals' and/or community's wellness for years or life-long? What sensing technologies can be used, now and in the future? How do we motivate individuals to use the system?

2. The Workshop

We therefore conducted a Workshop on Wellness Interventions and HCI (WIHCI) to bring together researchers and practitioners to share their experiences in successful design and implementation of wellness interventions and applications. We conducted this workshop jointly with a parallel Workshop on User-Centered Design of Pervasive Healthcare Applications (U-CDPHA): We found that the topics covered by these two workshops' submissions were very close, so participants would benefit merging the presentations and discussions.

We received a number of high-quality contributions from multi-disciplinary communities including the HCI community, pervasive health, and care, from a variety of sources, such as industry research and development, and academia. Nine submissions were accepted for the workshop. We were glad to see that with 25 participants we attracted considerably more persons than just the presenters, which we see as an indication that the topic of Wellness and Well-being is indeed relevant and "hot".

3. Topics for Discussion

We discussed three pillars of wellness research: theory, practice, and technology, and one cross-topic issue: design.

Behavioral Theories. A recent trend in computing has been to develop persuasive technologies to motivate people to change their everyday behaviors using various behavioral theories such as Goal-Setting Theory or Transtheoretical Model of Behavior Change [8]. As shown in existing literature, behavioral theories can help guide the design of wellness interventions and applications. Besides several theories that have been proven, what other theories can provide different perspectives at behavior change in terms of health promotion?

Wellness intervention practices. With rising concerns about health problems, such as obesity, sedentary lifestyles, and smoking, various wellness interventions have been practiced to promote good health behavior (e.g., physical exercise) or to prevent bad health behaviors (e.g., tobacco smoking cessation). It is generally accepted that effective intervention requires a coordination of individual-, family-, school-, and community-based interventions. Some exemplar wellness interventions include family-based interventions for pediatric obesity [9] and American horsepower challenge [6]. What are the lessons learned from these kinds of successful wellness practices and what are the opportunities for future application development to support such interventions?

Technology. With the increasing availability of sensor technologies, smart phones, and wireless broadband access, new types of health related applications become possible. Similar to chronic illness mHealth interventions, wellness interventions can utilize such technology to provide people with the ability to manage their health and receive just-in-time feedback. These systems aim to support the individual in living a healthy life, avoiding unhealthy behavior or unnecessary exposure to unhealthy environments, monitoring the personal health state, indicating changes etc. What are the challenges and opportunities for wellness data collection, visualization, and interaction?

Design. Since wellness is broadly defined and personally used, the target population for wellness applications is fairly diverse – everyone from lay populations to elderly to people with cognitive disabilities could utilize wellness applications. Therefore, there is a major need to understand how physical, emotional and cognitive abilities, caused by individual learning histories and health states, may impact the usage and acceptance of these systems. Hence aspects of acceptance and usability issues of pervasive healthcare applications have to be carefully considered in order to fully exploit the potential of future healthcare applications.

4. Presentations and main findings

The accepted papers were grouped into four sessions: User-centered design, Persuasion, Behavior Monitoring, and Challenges to the Field. In concordance with the broadness of the workshop's topic, the contributions covered diverse subjects.

In the design session, one paper [10] presented an ambient nurse calling system which takes into account the nurse's current context to reduce stress and improve reaction. The second paper [11] showed how advanced video communication might improve social connectedness as an important aspect of wellness.

Persuasion was covered by two papers presenting different approaches to persuade older adults and elderly to exercise: One work [12] aimed at using gesture based input and deploying the elderly person's social network, the other work [13] used virtual money as an incentive for walking and physical activity.

Three papers discussed aspects of behavior monitoring. One [14] analyzed personal health diaries to discover rules, the second paper [15] used peer-support for improved diabetes management in a low-income economy. Particularly impressive was the presentation about a mobile wellness tool aiming at preterm infants which showed how the needs of the family and of professional caregivers influence the design of a monitoring tool [16].

Finally, two papers discussed challenges to wellness informatics: One paper [17] considered benefits, but also potential drawback of today's technology to support physical and psychological well being. Given the highly personal aspect of wellness, we need an ecosystem of modular components that allows the adaption of on overall system to the individual user's needs. The last paper [18] identified two areas where persuasive health technology needs particularly more research: how to support one-time behaviors such as decisions on a certain treatment or vaccination, and how to design temporary wellness systems where the user is supposed to stop using the system after some time.

The discussion brought up further points which we considered in more depth in interactive group sessions in the afternoon:

Motivation strategies: Understanding the user's motivation is key to the successful adoption of technology for long-term well-being use. Today, we see limitations such as social stigmas, challenges to implement existing theories correctly, or the need to find the right balance between support and competition.

Life-long use of technology: Staying healthy is a life-long effort. Consequently, technology for supporting well-being is likely to be used over a long period of time, covering not just months, but years or possibly decades. What does this mean to technology?

Wellness vs health: The differences between health and wellness/well-being are a frequent matter of controversy and discussion. While we agree that no clear border exists, we believe that well-being is indeed a concentrated domain of health that is much more concerned on preventive action.

Aligning toward adoption: To have the user adopt technological solutions requires an in-depth understanding of the relevant factors such as the user's needs, fashion and trends, or experiences and group differences.

5. Summary

Wellness and well-being are a major topic for computer science. While the differences between well-being and "traditional" e-health are diffuse, there are many challenges arising only in the wellness and well-being context: What is or should be the life cycle of the interventions we design? Where does the wellness and health spectrum fit in our applications? How can we adapt applications for real world usage on ever changing technology?

To exploit the potential of technology for well-being, these challenges will need further research. In effort to contribute to shaping a research community on computer support for wellness and well-being, we aim to continue the discussions and are looking forward to future contributions.

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