

# An Approach for Sustainable Pervasive Wellness

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## ABSTRACT

Wellness is not simply absence of illness; rather, it is a much wider concept that extends beyond the confines of a single individual. Therefore, designing for wellness must encapsulate aspects of individual's inner world, as well as aspects that lie within the context of a wider world. We define these aspects of wellness through six spheres, namely physical, cognitive, mental, health, relational and environmental. In addition to taking into consideration these spheres, we contend that the overall wellness designs must provide awareness of wellness state, be contagious for wider adoption, become part of individual's habits and be fun to use, if the designs are to be sustainable.

## Author Keywords

pervasive computing, wellbeing, wellness informatics

## ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## INTRODUCTION

Modern societies, more than ever before, have the opportunity to positively impact on people's wellbeing. This is due to the evolution of communications, computing and in general ICT technologies. There has never been a better time in when the research activity can have a strong influence on the improvement of individuals' wellbeing within different spheres of every day life. These spheres comprise different dimensions, encompassing the broader state of individuals, including their physical and cognitive states, the emotional-social dimensions and the environmental factors affecting the person's overall wellness. In this paper we describe the main characteristics of these spheres, the main challenges that future research should address to fulfill them and an approach based on four requirements. These requirements should be fulfilled by new technological solutions in order to reach sustainability and increase adoption by users, namely: design for awareness (consciousness), design for sharing and spreading (contagious), design for entertaining (fun) and design for appropriation (habits).

## WELLNESS AS A SUM OF COMPONENTS

According to World Health Organization (WHO) Wellness is defined as "the optimal state of health of individuals and groups including two focal concerns: the realization of the fullest potential as an individual, and the fulfillment of one's

role expectations as a community member" [1]. The former definition implies that in order to fully reach the *Wellness State* it is necessary to thoroughly cover the individuals' overall state as a sum of components that are clearly distinct among them but at the same time strongly interrelated. This can only be done through the complete integration of the different spheres involved in people's wellbeing, depicted in Figure 1, in a continuous and a sustainable manner. In this respect, we propose a breakdown of constituent components of wellness and identify a series of challenges to tackle them individually and as a whole.

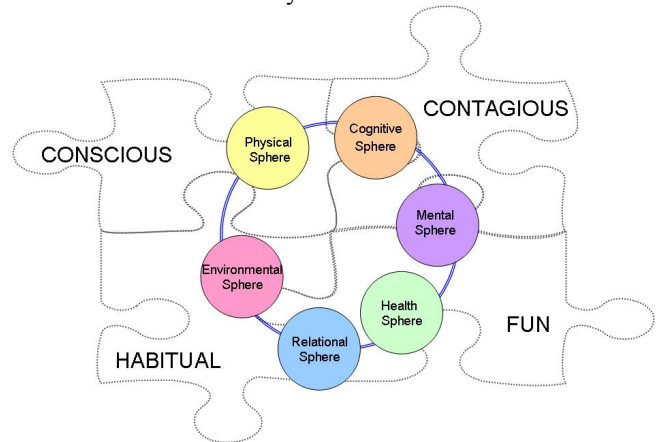


Figure 1 Wellness spheres and design requirements for sustainability

*Physical Sphere* – This sphere corresponds to the body, its weight, its shape, its limitations, the amount and quality of activity, its condition against age.

*Cognitive Sphere* – Corresponds to the mind, its activity, the long and short term memory, the intellectual and consciousness state.

*Mental Sphere* – This sphere is related to the motivation, the opinion about oneself, the attitude towards life, the spiritual and emotional state.

*Health Sphere* – Corresponds to the presence or absence of diseases, the impact of treatments, the dependability on others, the access to healthcare.

*Relational Sphere* – Includes the contact with the *external* world, the amount of social activity, the participation within traditional or new communities, the social role, the family, the work.

*Environmental Sphere* – Corresponds to the individuals' insertion as part of a bigger environment; the pollution and stress exposure, the everyday mobility, the things to do and the resources to achieve it.

## DESIGN FOR SUSTAINABLE WELLNESS

While, we contend that it is necessary to take into consideration the wellness spheres above to describe individual's wellness state, we also intend to present our preliminary thoughts aiming to partially address one of the open research challenge questions: How new systems need to be designed in order to maximize adoption from users? From our viewpoint, in order to achieve adoption of technologies targeting peoples' wellness in a sustainable way, future systems should provide systematically the four design considerations specified in Figure 1:

*Conscious* – In general, the fact of being conscious of one's physical, mental, environmental, health and other states, is an important asset towards own wellness management. This attribute that is obvious in highly motivated users (e.g. sports professionals) is not so evident for the broader population. With this adjective we mean that future systems will need to provide people with awareness of their wellness status in a continuous way without falling in the extreme of being intrusive.

*Contagious* – Future systems dealing with people's wellness should be designed to be *contagious* in the sense that people should find a clear benefit of adopting them either as part of a community or as single individuals. These future systems should be designed in order to provide social and personal rewards to the user not only in a specific sphere of wellbeing but ideally in all of them in order to maximize adoption.

*Habitual* – In order for design systems to be sustainable, they have to be embedded as part of users' daily life environment. In this sense their use has to become part of the peoples' *habits* for dealing with their wellness either through explicit interactions with devices perceived as useful or even in an implicit way with systems hiding in the background.

*Fun* – A first step towards habitual, implicit interactions improving wellbeing can be achieved through design that includes entertainment and fun as a main component. Some preliminary work has proven that designing for fun may engage users in positive behaviors improving some dimensions of wellness [3] and systematic use of such systems may contribute to maintenance of overall wellbeing condition.

## OPEN RESEARCH CHALLENGES

Reaching an adequate wellness condition in individuals and groups requires provisioning of attention not only to people with a compromised state of personal wellbeing but also to healthy people of all ages with their specific characteristics and constraints in a sustainable way. This implies the need to fulfill several research challenges dealing with the different dimensions of wellness mentioned before and also interrelations among them. In this way, future research on

wellness informatics field will include pervasive scenarios integrating different aspects of daily living and their concurrent impact on the different spheres of wellness. To achieve this, future systems will need to integrate and analyze multiple sources of data input, beyond traditional context aware computing paradigm by extending contextual dependencies and interrelations simultaneously to multiple potential viewpoints, impacting on different aspects of wellbeing. This fact poses several challenges from the technical point of view. For example, i) how the sensed information will be analyzed to simultaneously match multiple wellbeing criteria? ii) how will the correlations between different wellbeing spheres be established? iii) how to estimate the overall wellbeing state when some activities from one context (e.g. drinking with friends) may affect positively some wellbeing spheres (e.g. mental, relational) and negatively others (e.g. physical, health)? iv) where will be the borderline between wellness informatics and health informatics since both monitor similar personal information? vi) how new systems need to be designed in order to maximize adoption from users and how will they be evaluated? This is in addition to other unsolved questions from pervasive healthcare technologies [2] such as identifying the legal implications of personal information handling, and the boundaries for security and privacy among others.

## CONCLUSION

In this paper we have highlighted our ideas on wellness informatics and elaborated on how wellness informatics systems should be designed such that they become sustainable. The ideas presented here will serve as a basis to enrich overall discussion during the workshop and provide a direction towards holistic definition of wellness informatics.

## ACKNOWLEDGEMENTS

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