

# Positive Technology as a Driver for Health Engagement

Guendalina GRAFFIGNA <sup>a</sup>, Serena BARELLO <sup>a</sup>, Brenda K. WIEDERHOLD <sup>b-c</sup>, A. Claudio BOSIO <sup>a</sup> & Giuseppe RIVA <sup>a-d</sup>

<sup>a</sup> *Università Cattolica del Sacro Cuore, Milan, Italy*

<sup>b</sup> *Virtual Reality Medical Institute, Brussels, Belgium.*

<sup>c</sup> *Virtual Reality Medical Center, San Diego, California.*

<sup>d</sup> *Istituto Auxologico Italiano, Milan, Italy*

**Abstract.** Despite the fact that older adults are healthier than in the past, the current trend of an ageing population implies an increased risk and severity of chronic diseases. Low-resource healthcare systems face increased organizational healthcare costs, which is likely to result in an allocation of limited health resources. Healthcare organizations themselves must deal with patients' increasing need for a more active role in all the steps of the care & cure process. Technological advances may play a crucial role in sustaining people's health management in daily life, but only if it is "ecologically" designed and well-attuned to people's health needs and expectations. Healthcare is more and more called to orient innovative research approaches that recognize the crucial role of a person's engagement in health and well-being. This will enable patients to reach a higher quality of life and achieve a general psychophysical well-being. Thus, positive technological innovation can sustain people's engagement in health and invoke community empowerment, as we shall discuss in this document.

**Keywords.** people health engagement, patient engagement, health technologies, positive technology, well-being

## 1. Background

With people living longer, the ageing population is rapidly growing. Worldwide, the proportion of elderly people (age 60 and over) is growing faster than any other age group. Between 1970 and 2025, the growth of the elderly community is expected to reach 694 million or 223%. By 2025, there will be approximately 1.2 billion people over the age of 60. By 2050, there will be 2 billion with 80% of them living in developing countries. The proportion of people 65 years and older in European countries is projected to grow from 15% in 2000 to 23.5% by 2030 [1].

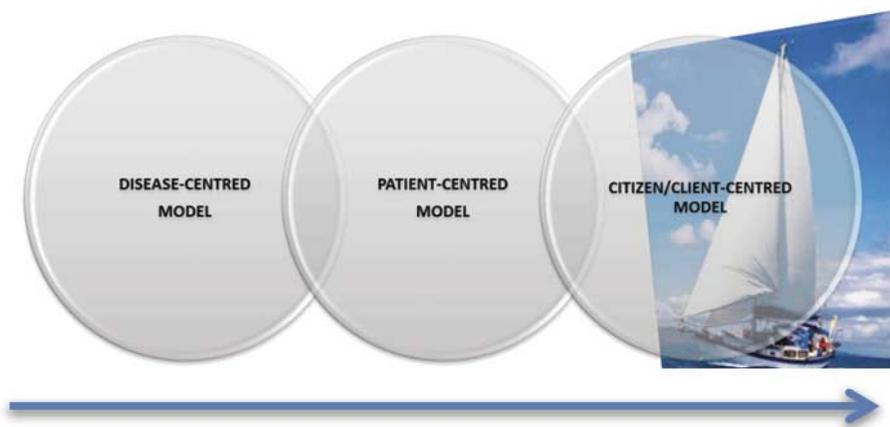
Increased longevity is a sign of success for public health and medical advancement, and can be considered as a consequence of the social and economic development but this increase leads to the following three main challenges:

### 1.1 *Healthcare organizations have to face an increased demand for health and well-being in times of economic constraints: how to find a sustainable organizational solution?*

Advances in treatment have increased survival leading to an increasing ageing population. This has contributed to the increase of chronic disease conditions, which have internationally become a major concern with a significant burden experienced by individuals, communities and health services. Chronic diseases, such as heart disease,

stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 63% of all deaths. Out of the 36 million people who died from chronic disease in 2008, 9 million were under 60 and 90% of these deaths occurred in low- and middle-income countries [2]. The increase in chronic conditions related to the progressively ageing population will constitute the major burden of the health economic system in the next 10 years [3-6]. With the global growth of the older generation comes the need to consider a population with a longer life expectancy that have an increased hope for a happy and healthy life status [7, 8].

There is a rise in the demand for “positive health” treatments and interventions based on the active promotion of people’s well-being and quality of life. This extends beyond basic care concerns, such as treatment of just the effects of an illness. In this context, patients/clients more exigently evaluate the quality of services received, thus putting extra pressure on healthcare organizations to sustain higher standards in the delivery of their services [9]. However, the global economic crises and the limited availability of resources are affecting the delivery and the quality of health services: that is forcing healthcare organizations to balance declining resources with increased healthcare costs. These challenges call for a revision of care models [7, 8] shifting from a disease-centred model to a more complex citizen/client model (Figure 1).



**Figure 1.** The shift from a disease-centred model to a more complex citizen/client model

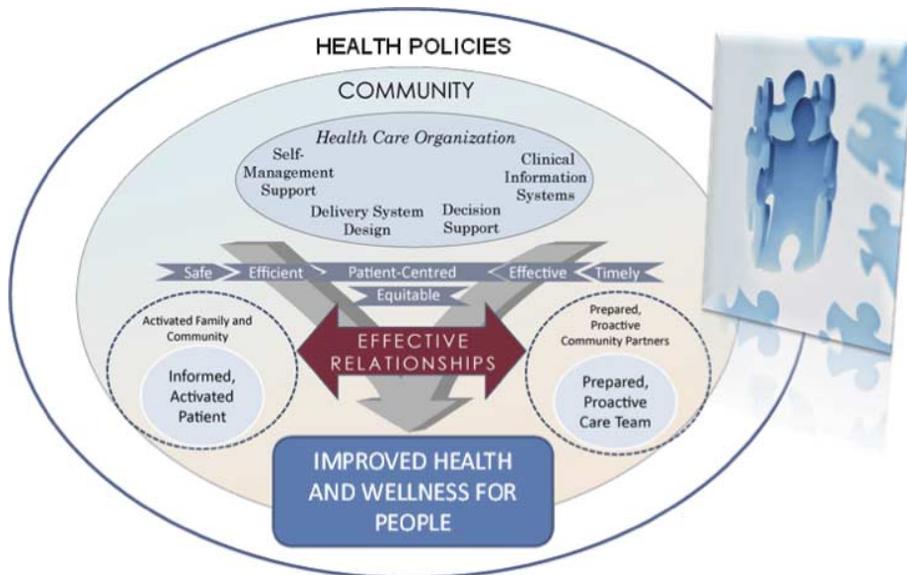
### *1.2 Healthcare organizations are facing having a more “critical” outside: how to establish dialogue and collaborate more with the active community?*

The challenges related to the increased demand for health and well-being urge healthcare systems to consider the care & cure boundaries which are now more of the classical setting for treatment (hospitals, clinic, etc.): emergence of new healthcare settings are arising from informal support networks that supply the increased demand for health and well-being.

Health organizations are required to respond to an increasingly active and critical outside and have to consider the patient’s increasingly less confined role in the healthcare they receive [10]. This is even more evident when considering the rural/dispersed and immigrated communities that require understanding and specific attention in regard to their cultural, anthropological, economic, and logistical needs and

priorities. The phenomenon of spontaneous peer networks created by patients to receive support and knowledge from other peers on management of their illness as well as other treatment options is growing. These spontaneous peer networks deserve particular attention, not only as a “challenge” for health professionals and the patient relationship, but also as a potential ally in the delivery of health services. Spontaneous networks play a crucial role in patients’ knowledge and practices in regards to care & cure.

Peer networks are increasingly diffuse due to development of new technologies and forms of mobile communication (for example: the web 2.0 world and the support that patients receive from web communities, online blogs, and so on). There is the need for new care & cure approaches that shift from the classical disease/doctor centred model based on the expert knowledge and hegemonic role of the doctor, to new healthcare management models (see Figure 2) that recognize citizen-client rights in healthcare [11]. This will also lead to the development of new objectives in health policies not restricted solely to the treatment of disease but also aimed at prevention and the promotion of health and well-being [12].



**Figure 2.** The shift in healthcare management models (adapted from: Haskett, T. "Chronic illness management: Changing the system." *Home Health Care Management & Practice* 18.6 (2006): 492-494)

### 1.3 Technological innovation for healthy ageing risks being a “top down” application: how to make technological support ecological and attuned to the ageing community's needs and priorities?

Technological advancements can significantly improve the lifestyle of the elderly and dispersed/marginalized communities. Assisted Living Technologies [13] may deliver valuable remote services to people with special needs that will support the management of their daily life. This technology opens the possibility for implementation of

specialized services, such as: assistance for daily activities, health monitoring, and emergency systems.

However, when assisting elderly people and dispersed/marginalized communities it is important to understand how they could benefit from technological innovation that will be ecologically transferred and not a “top down” imposition. The risk of prototypes – although innovative and highly promising – is hardly transferable in the specific anthropological, cultural and psycho-social daily context of elderly people. Often technological innovation answers questions that are not yet being discussed by people.

This could impact their daily life by imposing important change to their normal routines. Some targets within the population/communities may appear resistant, even hostile, to technological innovation. It is important to understand the experiential and emotional mindset of people towards their care & cure process and towards technology in general (i.e. their degree of willingness of adopt technological solutions) in order to better sustain technological integration into the community. In other words, people shouldn't be considered a “target” of new technological solutions, but active partners to involve in the development and delivery of innovative and usable technologies.

## **2. Positive technology to support health engagement and community empowerment**

As a consequence of the issues previously outlined, there is a need for taking a holistic view of people's healthcare needs to directly engage them in the design and delivery of services really able to meet their needs. Then we must identify and apply the best practices to health services and performance management. To meet these challenges and make healthcare systems equitable and sustainable, policymakers should look at positive technological innovation as a tool for people's engagement in health and community empowerment [14].

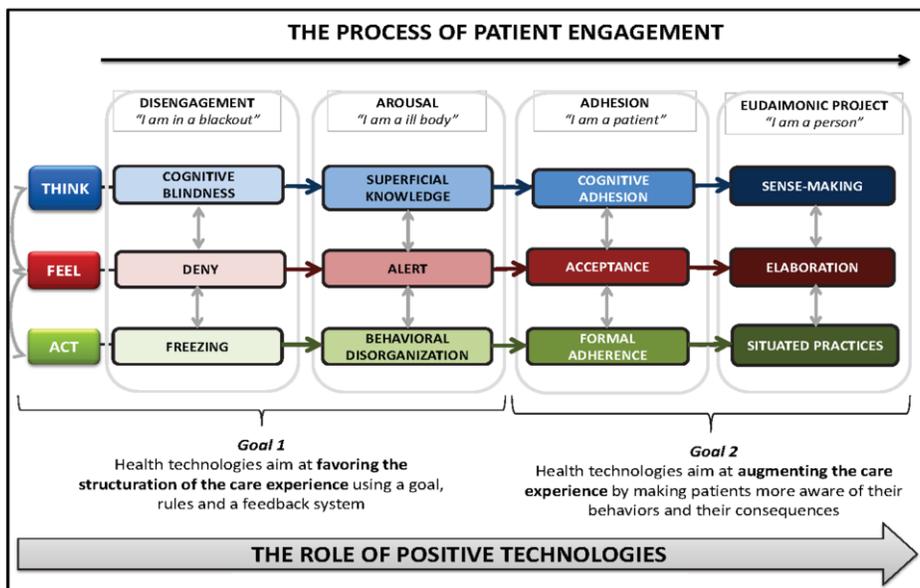
### *2.1 A model of the patient health engagement experience*

The discipline of “Positive Psychology” focusing on personal experience may provide a useful theoretical framework to foster people's engagement in health management. In this view, patient engagement can be conceptualized as a subjective experiential process resulting from the conjoint conative (act), cognitive (think) and emotional (feel) enactment of individuals in their health management (see Figure 3). This process consists in four subsequent phases (disengagement, arousal, adhesion and eudaimonic reconfiguration) in which the different experiential dimensions play complementary driving roles, as key factors for promoting patients' advancement in this process [15, 16]. The unachieved synergy among these dimensions inhibits patients from fully engaging in their care process, thus limiting the benefit from the healthcare [17, 18].

People Health Engagement (PHE) relates to higher quality of care and patient-doctor relationship, thus improving patient's clinical markers and compliance to proscribed therapeutic regimens [19]. This makes people aware of their health service options by supporting them in the decision making process and engaging them in preventive health behaviors is vital to achieve successful health outcomes [20]. By favoring a good psychological and emotional tenure, it will foster a self-image as active and engaged and may improve an internal locus of control over disease. This will

reinforce the feeling of empowerment. These components appear crucial in order to guarantee a higher quality of life and a more positive health experience at the hedonic and eudemonic level.

Patients constitute a powerful resource in healthcare and their engagement is essential to gain quality goals and improved outcomes in terms of disease prevention (i.e. cancer screenings), healthy behaviors (i.e. weight control, not smoking) and preventing the waste of resources (i.e., hospitalization, emergency department use) [19]. PHE in the therapeutic process is a crucial element in order to make the patient feel a part of the treatment plan itself, and thus to adhere better to the prescribed therapy with a decrease of relapses. Finally, to engage people in health is vital to social inclusion and the maintenance of an active role in the society. A more engaged and motivated person is active and the main character in his/her community. Thus, people will be more able to maintain social linkage and to strengthen their role and contribution to the society in general.



Graffigna G, Barelllo S, Riva G. How to make health information technology effective? The challenge of patient engagement. Archives of Physical Medicine and Rehabilitation, 2013 (in press)

**Figure 3.** The role of positive technologies in sustaining the process of people health engagement

## 2.2 Positive technology as tool for health engagement and community empowerment

Information and communication technologies (ICT) are becoming a strong part in daily lives. ICT can be helpful in fostering personal growth and community empowerment [21]. It is generally assumed that ICT assists individuals in improving the quality of their lives. However, the impact of new technologies and media on well-being and positive applications is still somewhat controversial. Here, we contend that the quality of the treatment experience should become the guiding principle in the design and

development of new technologies. Specifically, we propose the “Positive Technology” approach [22-25] - the scientific and applied approach to the use of technology for improving the quality of our personal experience through its structuring, augmentation and/or replacement. This is a way of framing a suitable object of study in the field of ICT. We suggest that it is possible to use technology to influence three specific features of our experience – affective quality, engagement/actualization and connectedness – that serve to promote adaptive behaviors and positive functioning.

In this framework, positive technologies are classified according to their effects on a specific feature of personal experience (see Figure 4):

- **Hedonic:** technologies used to induce positive and pleasant experiences;
- **Eudaimonic:** technologies used to support individuals in engaging and self-actualizing experiences;
- **Social/Interpersonal:** technologies used to support and improve the connection between individuals, groups, and organizations.

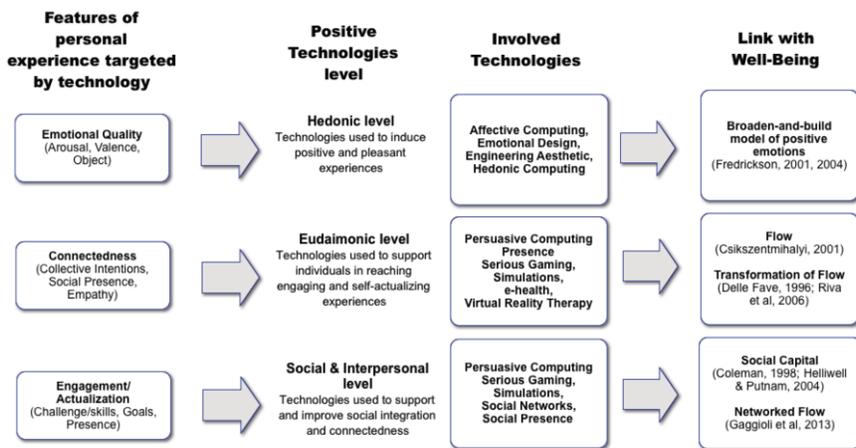
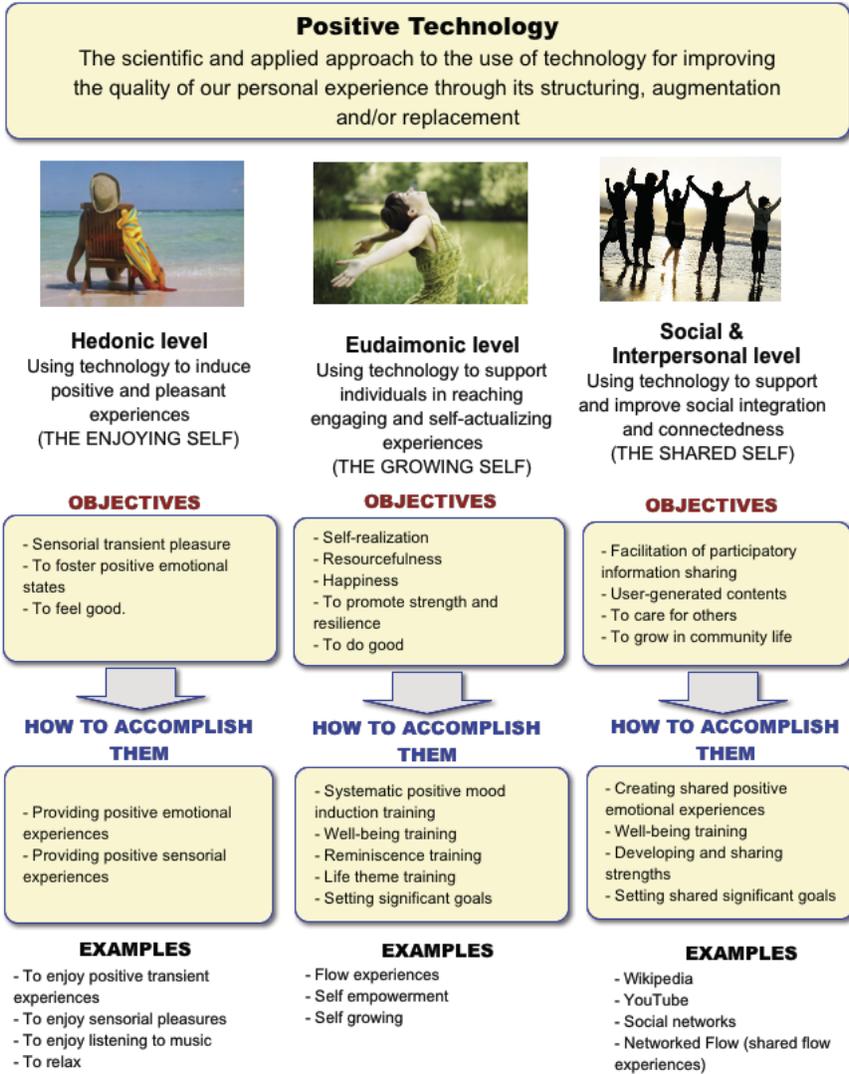


Figure 4. Effects of positive technologies on personal experience (Adapted from [22])

For each level we identified critical variables that can be manipulated to guide the design and development of positive technologies. Technology can be used to manipulate the features of an experience in three separate but related ways (Figure 5):

- **By structuring technology using a goal, rules and a feedback system:** The goal provides subjects with a sense of purpose focusing attention and orienting his/her participation in the experience. The rules, by removing or limiting the obvious ways of getting to the goal, push subjects to see the experience in a different way. The feedback system tells players how close they are to achieving the goal and provides motivation to keep trying.
- **By augmenting technology to achieve multimodal and mixed experiences.** Technology allows multisensory experiences in which content and interaction are offered through more than one of the senses. It is even possible to use technology to overlay virtual objects onto real scenes.

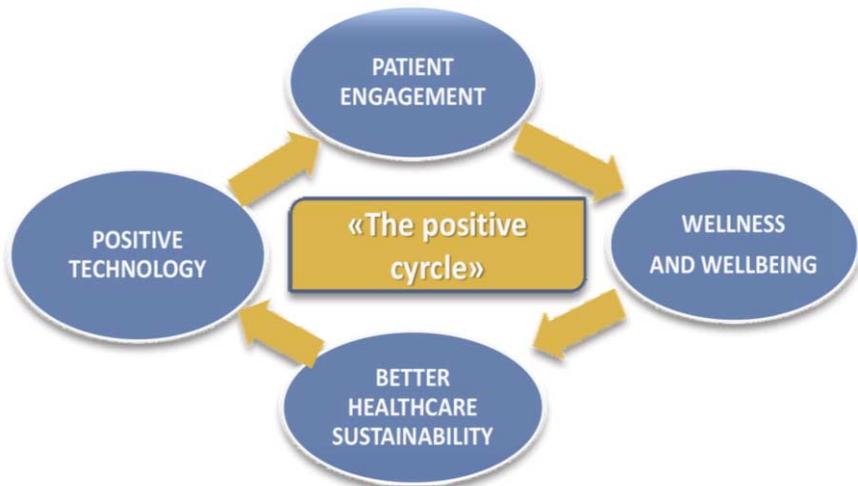
- **By replacing physical experiences with a synthetic one.** Using virtual reality can simulate a physical presence in a synthetic world that reacts to the action of the subject as if he/she were really there. The replacement possibilities offered by technology even extend to the induction of an illusion of ownership over a virtual arm or a virtual body and the use of robotic prostheses to replace healthy or defective body parts with artificial mechanisms and systems to improve function.



**Figure 5.** Critical variables guiding the design and development of positive technologies (Adapted from [24])

### 3. Conclusions

On these bases, we argue that the goal for the future will be to use Technology Engagement (the subjective sense of being fully immersed in the interaction with a given technology - presence and flow) produced by Positive Technologies to improve People Health Engagement (the conjoint conative (act), cognitive (think) and emotional (feel) enactment of individuals in their health management – Figure 6).



**Figure 6.** The Positive Cycle

This vision suggests a “continuum of care” where the interaction between the patient and their doctor(s) is not limited to the short ambulatory visits or to the therapeutic sessions in a clinical setting. The process-like modeling of patients’ engagement that we propose, potentially leads to a real revolution of healthcare boundaries by posing the bases for a true and sustainable partnership between patients and health providers. In this perspective, while the process of patient engagement evolves, even the individual patient’s relationship with the the healthcare system assumes different shapes (relational closure, devolution, alliance, partnership) thus implying a continuous realignment of roles and power dynamics.

By using Technology Engagement to boost Patient Engagement we expect:

- The improvement of prevention and treatment through accurate and engaging real time activities and feedback;
- The increase of reassurance and motivation to a more active participation in illness prevention and care processes.
- The fostering of patients’ autonomy by scaffolding them through the engagement process and shaping the power dynamics according to their needs and conditions.

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