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Information and communication technologies have become a pervasive presence in our lives, yet its potential for improving people’s wellbeing is not fully understood. Most psychological research on the impact of computers and the Internet has focused on the negative side of technology – i.e. how the use (abuse) of interactive systems, videogames can negatively affect mental health and behaviour. On the other hand, less attention has been devoted to understand how emerging technologies can promote optimal functioning at individual, group and community levels. The main motivation of this book is to explore this question, by examining what roles technology can play in the development of psychological interventions aimed at helping people to thrive.

The interest towards the scientific study of well-being has a long history, dating back to the humanistic psychology with the important concept of fully-functioning person and self-actualization proposed, respectively, by Carl Rogers (Rogers, 1961) and Abraham Maslow (Maslow, 1954). Since that moment, the past half century has seen the study of the psychological aspects of what makes life worth living recede to the background, whereas studies on disorder and damage have taken center stage. The recognition of this imbalance and a desire to address the full spectrum of human experience has led to the birth and development of Positive Psychology (Seligman & Csikszentmihalyi, 2000), a multifaceted research area interested in investigating “what makes life worth living” (Peterson & Seligman, 2004). The scientific study of optimal human functioning is pursued at three different levels of analysis: subjective, individual and social. The subjective level focuses on positive subjective states such as happiness, well-being, satisfaction with life, love, hope and optimism, as well as on the conditions under which these positive experiences occur. The individual level is concerned with the identification and cultivation of positive individual traits and engagement in absorbing activities (i.e., flow). The last level - societal - focuses on creating and maintaining meaningful positive relationships and positive institutions. The societal level is also concerned with fostering those civic virtues that are capable of promoting better citizenship, by increasing responsibility, altruism, tolerance of diversity, equality, opportunity, civility, reciprocity and moderation.

Martin Seligman, one of the pioneers of Positive Psychology, introduced the “Authentic Happiness” theory, which identifies three key components of optimal functioning (Seligman, 2002):

1. **The Pleasant Life**: Achieved through the presence of pleasure and promoted by activities that increase positive emotions;
2. **The Engaged Life**: Achieved through engagement in empowering activities and utilization of own strengths and virtues;
3. **The Meaningful Life**: Achieved by identifying and connecting with something larger than oneself.
The pleasant life is based on a hedonic definition of well-being, which is rooted in Epicurean equation of happiness with pleasure, comfort and enjoyment. Kahneman and colleagues (Kahneman et al., 1999) defined hedonic psychology, one of the two fundamental approaches of Positive Psychology (Ryan & Deci, 2001), as the study of “what makes experiences and life pleasant and unpleasant”. So defined, the hedonic approach poses for itself an ambitious target of research and intervention by maximizing human happiness. Although there are many ways to evaluate the pleasure continuum in human life, most study has used assessment of subjective well-being (SWB) (Diener & Lucas, 1999), that consists of three components: life satisfaction, the presence of positive mood, and the absence of negative mood. The salience of positive emotions in increasing well-being is addressed by the “broaden-and-build model” of positive emotions (Fredrickson, 2001; 2004). According to Fredrickson, first of all positive emotions provide the organism with undefined action tendencies that may lead to adaptive behavior. Secondly, positive emotions could reduce or mitigate the impact of stressful negative emotions and, finally, positive emotions have fundamental long-term effects by broadening the thought–action repertoire and by building future physical, psychological, and social resources.

The engaged life is a eudaimonic definition of well-being, that is rooted in Aristotle’ ethical doctrine and its advocacy to fully realize our true nature (one’s daemon), through the exercise of personal virtues in pursuit of a common good (Ryff & Singer, 2008). According to eudaimonic view, well-being consists of more than the merely satisfaction of pleasure because it involves instead the actualization of human potential (Ryan & Deci, 2001). Ryff & Keyes (1995) have introduced the concept of psychological well-being (PWB) that consists of six aspects of human experience: autonomy, personal growth, self-acceptance, life purpose, mastery, and positive relatedness. Self-determination theory (Deci & Ryan, 2000; Ryan, Huta & Deci, 2008) is an interesting perspective that has embraced the concept of self-realization as a central aspect of well-being specifying what it means to actualize the self and how that can be accomplished. Within the eudaimonic approach, Peterson and Seligman (2004) identified six universal virtues (wisdom, courage, humanity, justice, temperance, and transcendence) that are favoured by character strengths representing the psychological components of them.

The last level – the meaningful life - integrates individual well-being to social well-being by serving a purpose larger than oneself to promote connectedness between individuals, groups, and communities (Keys & Haidt, 2003). In this framework, Ryff and Singer have embraced introduced the concept of interpersonal flourishing, which could be defined as the development of positive relations with other people as a key dimension of well-being (2000).

However, more recently Seligman realized these three components were not exhaustive elements of happiness. In particular, he acknowledged three main limitations of the Authentic Happiness theory: first, it did not take into consideration the role of other key variables, such as success and the sense of control. Furthermore, according to Seligman, the term happiness itself was misleading, because it posits a superficial identification with “feeling in a good mood”, while neglecting the dimensions of engagement and meaning. A further weakness was that happiness was mainly operationalized as life satisfaction and measured subjectively by self-report thus overlooking the assessment of the other two components – engagement and meaning (Seligman, 2011). To overcome the limitations of Authentic Happiness theory, in 2011 Seligman introduced the PERMA model (Seligman, 2011), an acronym for the five pillars of well-being: Positive emotions, Engagement, Relationships, Meaning, and Accomplishment. Of these components, three were inherited from the former Authentic Happiness model. The additional ones – relationships and accomplishment – refer, respectively, to the role played by significant others in helping us to face the challenges in life, and to the motivation to achieve, to have mastery, and competence.
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Positive Psychology proposes a novel approach to study human behavior, which encompasses all traditional areas of psychological investigation by proposing a transversal approach to psychology, with applications in a number domains, including work, development, education, clinical, health and community (Delle Fave, Massimini, & Bassi, 2011). However, in their recent review of positive psychology McNulty and Fincham indicate the need to think beyond positive psychology (McNulty & Fincham, 2012) and an interesting suggestion comes from the shift of the focus to personal experience (Riva, 2012): how it is possible to manipulate the quality of personal experience with the goal of increasing wellness, and generating strengths and resilience in individuals, organizations and society?

To answer to this broaden question, the first step is recognize the impact of technology-mediated experiences delivered through smartphones, tablets and other personal wearable devices. On one side, in fact, ICTs are becoming more and more popular in daily life because they are user-friendly and low-cost. On the other side, the technological sophistication has allowed the development of increasingly advanced devices.

According to Riva et al., (2012), emerging technologies could be used to manipulate personal experience in three separate, but related ways:

- **By structuring it** using a goal, rules, and a feedback system to provide individuals with a sense of purpose focusing his/her attention and orienting his/her participation in the experience;
- **By augmenting it** to achieve multimodal, mixed and interactive experiences;
- **By replacing it** with a synthetic one using VR system to simulate physical presence in a synthetic world that reacts to the action of the individual as if he/she was really there.

In order to manipulate and enhance the features of our personal experience, Positive Psychology appears to be a promising framework to develop ICT that foster positive emotions, promote engagement in empowering activities and support connectedness between individuals, groups, and communities.

**ORGANIZATION OF THE BOOK**

The starting point of the book is the assumption that there is an emerging convergence of technologies, that are always more used to support our daily activities, and the search for wellbeing that is a transversal goal of the psychological discipline.

Following this perspective, the book is divided in five sections:

**Section 1:** Empowerment, Engagement, and Change: The Three Pillars of Positive Technology.
**Section 2:** Design Positive Systems.
**Section 3:** Positive Interventions: Health Care.
**Section 4:** Positive Interventions: Games for Well-being.
**Section 5:** Positive Interventions: Cognition and Stress.

**Section 1 - Empowerment, Engagement and Change: the three pillars of Positive Technology** – includes three chapters that focus on the theoretical foundations of the Positive Technology approach. In Chapter 1, Riva and colleagues describe “Positive Technology” as the approach to using of technology for improving the quality of our personal experience. On the one side, the authors suggest that our cog-
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PPIs) and the digital world. This chapter presents an updated review of the relationship between these two fields (PPIs and technologies), and discusses relevant considerations that should be taken into account when technologies are used to deliver PPIs, as well as the elements that can moderate their effectiveness. The final aim of the chapter is to provide readers with basic tools to make critical judgments about PPIs delivered via a technological format.

In Chapter 3, Barello and colleagues move on describing the participatory health revolution stating that consumers’ health behaviors are increasingly influenced by people’s desire to play an active role in promoting a positive life functioning and technologies are addressing this emerging need. This chapter describes the results of a software-assisted quali-quantitative study aimed at exploring the scientific debate about technological interventions for wellbeing in the era of participatory health. Based on the study’s results, technologies for wellbeing in the participatory health era may be clustered depending on the “context of delivery,” on their degree of personalization,” and on their inner “conceptualization of positive interventions”. A consumer health perspective may be a compass to orient the planning and delivery of technological solutions aimed to sustain positive psychological interventions by effectively engaging people in health and wellbeing management, keeping in mind a dynamic vision of a participatory health construction.

Section 2 - Design Positive Systems – moves the attention to the other side of the coin, that refers to the importance of taking a critical design approach and exploring how design may have an impact on the users psychological wellbeing.

In Chapter 4, Calvo and colleagues start from the idea that technology based mental health interventions can be particularly effective for young people. Amongst these, online support groups are becoming increasingly popular. This model of mental health service provision includes moderators who read posts, recognise those that need attention and provide support via online responses. However, as these groups become more popular they risk becoming more difficult to manage due to the sheer volume of posts. This challenge can be addressed through computational linguistics techniques. This chapter reports on work with a mental health organisation on three components to help scale up the number of people they can support. The design aims to go beyond helping end-users and explores how design can support the wellbeing of the moderators themselves.

In Chapter 5, Waterworth and colleagues examine what elderly people actually want and need when it comes to technologies designed to support and encourage their physical fitness. Starting from the premise that physical exercise has a significant beneficial effect on mental and physical health, and elderly
fitness programs are a good and widely accepted approach to prevent frailty, authors present the ELF@ Home project as a case study, and report design insights and other results from user involvement in the project. The project proposes the adoption of new technology in everyday life from the perspective of positive psychology, approaching this aim by designing devices and systems that are actually usable and desirable in supporting extended healthy living for this target population.

In Chapter 6, Kavlaki and colleagues focus on how to develop tools for positive technology and more specifically, mobile e-mental health systems using a virtual stress counselor. The main objective is to develop a framework for mobile e-mental health systems reviewing existing e-mental health apps and discussing necessary system requirements. Current e-mental health apps do not offer any facilities to promote social interaction between the counselor and the user. The proposed framework requires personalized interactions between a virtual counselor and a student through feedback aimed to reduce stress level and enhance personal stress management strategies. This requires integration of technologies for facial expression detection, speech and emotion recognition as well as other psycho-physiological feedback. The chapter aims to describe a prototype system for e-mental health and to discuss the components of the system architecture.

Sections 3, 4, and 5 are dedicated to describe Positive Interventions in three different fields, respectively Health Care, Games for Well-Being, and Cognition and Stress.

Concerning Health Care, Carissoli and colleagues present an emerging model of pregnancy care. In Chapter 7 authors investigate how it is possible to enhance women’s well-being during pregnancy by taking into consideration the three levels of well-being identified by positive psychology and how actual mothers-to-be use new technologies to meet several needs. Furthermore, authors describe their Italian mobile app “BenEssere Mamma” aimed to support mothers’ well-being during pregnancy.

In Chapter 8 Serino addresses the worldwide health policy priority of identification of effective cognitive empowerment programs in elderly population. Specifically she focuses on the use advanced technologies as effective tools for a new class of applications aimed at improving the traditional cognitive empowerment in elderly. The attention is devoted on how advanced technologies may be used to support elderly in reaching engaging and self-actualizing experiences. On the basis of the most recent evidence in literature, the possible advantages in using such advanced technologies for improving well-being in frail elderly are discussed.

In Chapter 9 Bercovitz and Pagnini still focus on elderly population and discuss the many ways in which older adults can benefit from learning new technologies, including enjoying more functional independence, social connection, and cognitive engagement. Authors recognize the existence of barriers that prevent older adults from learning new technologies, including physical ailment and disability, skepticism over the benefits, and stereotype threat. To help older adults in overcoming these barriers they introduce the concept of Langerian mindfulness and the importance of how learning to be mindful as opposed to mindless.

Within the Section 4 – Positive Interventions: Games for Well-Being, Chapter 10 introduced Serious Games (SGs) as new opportunities for human training and empowerment, imparting knowledge or skills in an engaging and motivating way to a new generation of learners. Further, they can be used to improve the quality of both individual and collective experience. In particular, SGs can nurture positive emotions promote engagement, as well as enhance social integration and connectedness. Argenton and colleagues present an in-depth analysis of each of these aspects, with the support of concrete examples and case-analysis and a game design practice.
In Chapter 11, Tichon and Tornqvist discusses a range of positive psychological effects associated with playing two genres of popular off-the-shelf video games as opposed to video games that have been constructed to specifically target education or teach health-related lessons. The positive psychological outcomes of play are especially investigated in the areas of resilience, competency, and autonomy. These outcomes have potential application across a number of areas of education and preventative health.

The interest in videogames is the object of Chapter 12, where Triberti discusses on complex emotions generated by videogames. On the one hand, video gamers may feel frustration and anger due to the difficulty of the gameplay. On the other hand, they may experience sadness, anxiety and fear due to the immersion into emotionally rich narratives. Yet, video gamers seem to appreciate gaming technologies generating negative emotions, and the research on media frequently highlights a counterintuitive positive relationship between negative affect and enjoyment/well-being outcomes. Starting from these premises, the present chapter aims to review the negative emotions typical of video games, in order to understand in what ways they can concur in generating an overall positive experience. Then, the chapter discusses implications for research on video games as positive technologies, namely technologies able to promote well-being in their users.

In Chapter 13, Diaz-Orueta provides an overview of the state-of-the-art serious games currently available as psychological interventions across popular delivery formats (virtual reality environments, online and PC videogames) and discusses their potential to complement traditional psychological interventions and improve psychological wellbeing for people of all ages.

Finally in Section 5 - Positive Interventions: Cognition and Stress, in Chapter 14, Villani and colleagues describe how Positive Technology can help people cope with stress in several contexts. On the one hand, thanks to the combination of traditional assessment measures of stress and the analysis of physiological correlates of this experience, it is possible to overcome limitations related to self-reported data and move towards self-tracking. On the other hand, the emerging convergence of technology and health care is offering new methods and tools not only to assess but also to cope with stress. In this view, there is growing empirical support for the use of several technologies for stress management protocols. This chapter focuses on the hedonic and eudaimonic experiences supported by technologies in terms of inducing positive affective states and supporting personal growth by teaching strategies to reduce stress and enhance well-being.

Chapter 15 explores how immersion in virtual reality (VR) evokes emotional states similar to those of the real world, and how deliberate immersion in high-stress situations can help teach individuals affective strategies to remain in control of their emotions. Affective Control Theory (ACT) proposes that affective strategies that typically strengthen and support performance are skills integral to stress management. Thus, Tichon and Mavin describe how VR experiences allow individuals the opportunity to practice coping with their emotional states while immersed in difficult scenarios.

One important task of Positive Psychology is to develop effective interventions to increase and sustain processes of mental health, subjective and psychological well-being, functional groups and flourishing institutions.
This book is not exhaustive, meaning it does not address every positive topics of inquiry, but it attempts to take a first step in what we hope will be an ongoing rigorous and dynamic multidisciplinary journey towards the integration of technologies in positive psychology practice.

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