Chapter 14
Tools for eMental–Health:
A Coping Processor for Adaptive and Interactive Mobile Systems for Stress Management

Manolya Kavakli
Macquarie University, Australia

Amir Maddah
Macquarie University, Australia

Hedieh Ranjbartabar
Macquarie University, Australia

Kiumars Ranjbartabar
Macquarie University, Australia

ABSTRACT

This chapter focuses 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. The chapter states that 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. It provides personalized feedback to reduce stress level and enhances personal stress management strategies. This requires integration of technologies for facial expression detection, speech and emotion recognition as well as other psycho-physiological feedback. A prototype system for e-mental health has been developed and the components of the system architecture have been widely discussed including the need for a coping processor. Finally, conclusions are drawn regarding the tools for positive technology.

INTRODUCTION

Virtual Reality (VR) has resulted in creative solutions offering entirely new options for human computer interaction (HCI). VR technologies combined with social networking and mobile phone technology present a new cyber-landscape that have potential to supplement or complement traditional professional practices; producing new learning processes, environments, and tools; and expanding borders of science beyond anything this world has ever seen. VR applications have demonstrated that they can reduce fear

(Malbos et al., 2013), acute pain in burn patients (Hoffmann et al., 2000), eating disorders (Riva et al, 1999), post-traumatic stress disorder (Rothbaum et al., 1999), and stress in cancer patients (Scheider and Workman, 1999). Therefore, VR applications deserve to be considered as positive technology tools and may be used to improve physical and mental health.

There is a significant need to promote mental health and wellbeing by the development of e-mental health applications that link mobile tools with traditional forms of counselling. Today, almost three-quarters of Australians report that stress has an impact on their physical health. High demand for mental health services and limitations of online facilities available add pressure on service providers. As a result, online mental health services that use health promotion technologies in Australia have been going through rapid changes in models of service delivery to address the demand. A virtual advisor always accessible on a smart phone is a promising way to address the aforementioned problem.

The main objective of this chapter is to review e-mental health systems, to present a debate on the development of e-mental health systems using VR as a tool for positive technology, and to evaluate their use discussing relevant ethical issues. To be able to evaluate potentials of VR-based mobile e-mental health systems we present a framework after reviewing existing e-mental health apps and discussing necessary system requirements. The proposed framework is based on personalized interactions between a virtual counselor and a student requiring help to manage their stress levels during exams and expected to provide personalized feedback to reduce stress level and enhance personal stress management strategies of students. In this chapter, we explore the use of virtual stress counsellors investigating a number of research questions such as:

Is the use of avatars meaningful in e-mental health applications as virtual stress counselors?

- Is it possible to improve the stress management skills of a person by interacting with an avatar?
- How can we use avatars and animation technology to improve coping processes?

The remaining section of this chapter focuses on how to develop tools for positive technology and more specifically, a mobile application presenting a virtual exam-stress counselor. First e-mental health systems are reviewed, and system requirements are defined, then, a generic framework is proposed. Finally, the components of the system architecture are discussed and conclusions regarding the tools for positive technology are drawn and associated ethical concerns are discussed in the evaluation of solution.

E-Mental Health Systems as Positive Technology Tools

Technology has been pushing fundamental changes in social life. As stated by Psotka (2013), more than two billion people were using the Internet globally in 2010 including three quarters of the American population more than a doubling increase since 2000, and online learning increased from 45,000 enrollments in 2000 to roughly one million in 2007 showing signs of continuing to grow at more rapid pace, a power function expansion. This is expected to increase with the adoption of augmented reality technology that may allow to present scenarios that include features not available in reality. This would be the case when cueing stimuli are presented to determine what level of augmented information can be used by patients to provide insight for the development of compensatory strategies aimed at improving day to day functional behavior (Rizzo et al, 2003).

Although VR, computer games, and social media may be seen as disruptive technologies by some researchers (e.g., Psotka, 2013) due to the public's enthusiastic adoption of these new technologies, we

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