

Information and communication technologies (ICT) have changed communications in everything from the personal sphere to professional and scientific realms. The popularity of these new tools is unquestionable and their continuous growth is owed not only to advances in information technology but also to the considerable reduction in costs which has made them increasingly accessible to more professionals. In spite of the issues and the obstacles that still appear, ICTs have brought about a big improvement in the quality of our lives. Their use in the field of healthcare has generated new paths to recovery for many disorders. In psychology, these tools have been applied in many different contexts (experimental, clinical, educational, social, etc.). Here we will focus on clinical psychology and examine the enormous potential that ITCs offer this field. Some of the most utilized technological tools in clinical psychology include personal computers, televisions, mobile phones, PDAs, tablets, virtual reality (VR) and augmented reality (AR). There is already plenty of empirical evidence on the use of virtual worlds or Internet for the psychological treatment of different disorders. For example, “cyber-therapy” involves the use of IT devices as tool to enable or improve the provision of therapeutic services (either on its own or as a supplement to traditional therapies). It also makes use of applications such as virtual reality or augmented reality, both of which have enormous potential in the treatment of a wide range of psychological problems.

This publication, *Anuario de psicología clínica y de la salud/Annuary of Clinical and Health Psychology*, aims to review and provide updates on the most interesting research trends in clinical psychology. Considering the enormous interest that the use of VR technologies has sparked in the field, this issue of the Annuary includes important contributions by specialists who have been pioneers in the field internationally and are renowned for their scientific production. VR is a new technology in which computers and other devices produce a reality experience that allows the user to actually feel like she is there. With VR, the user can see, hear and feel in a world that is graphically generated in three dimensions and then interact with that world. In the clinical sphere, VR lets the user experience a virtual situation that is clinically significant and relevant to the disorder that is being addressed in a safe environment, under the supervision and accompanied by his therapist. Its principal contributions are immersion (the feeling of being physically present in the virtual world) and interaction (the possibility to interact with the virtual world in real time). As for AR, it is an even more novel virtual reality technique that consists of incorporating virtual elements to the real world. Though still in its initial phases, AR is already being utilized for a range of disorders, including treatment for

spider and cockroach phobias.<sup>1</sup> In AR, the participant sees an image of the real world overlaid with virtual elements. These objects can be part of a broader virtual world whose contents can be accessed in different ways, using different communication methods (mobile phones, tablets, PCs, PDAs, Internet, etc.)

In the first article of this issue, S. Quero, C. Botella, V. Guillén, M. Moles, S. Nebot, A. García-Palacios, V. Guillén y R. Baños, researchers from the Spanish universities Jaime I de Castellón and Valencia, present an excellent work entitled *Virtual reality for the treatment of emotional disorders: A review*. Here they examine the current state of clinical research on the use of presence-inducing technologies, especially VR and its applications in the treatment of different types of emotional disorders: phobias, panic disorder and agoraphobia, and stress related disorders such as post-traumatic stress disorder, adjustment disorder and pathological grief. They analyze the advantages and limitations of these technologies, including the lack of standardization in VR devices and software, the fact that there are no standardized protocols for the community of researchers and the costs required for the set-up trials. In addition, the authors discuss the need for precaution with regard to patient safety and ethical issues. Finally, they present opinions and challenges for the future of VR, whose use will continue to expand beyond the PC reserved for the therapy session.

The second article, *Normalization of the eating patterns in a patient with anorexia nervosa, purgative subtype, with the support of a virtual environment. A case study*, is by C. Perpiñá, A. Ferrero, C. Carrió and M. Roncero from the University of Valencia and the Agencia Valenciana de Salud (Spain). This interesting preliminary study analyzes the advantages of using a VR component to normalize eating patterns in the general cognitive-behavioral treatment of a patient with purgative AN. The authors show that the VR component was not only perceived as useful by the patient but also helped her reduce her fear and avoidance of food. In addition, it helped her to eat and to establish a more normalized eating pattern with fewer bingeing and vomiting episodes by increasing her BMI and improving her emotional symptoms. Immersion software was not used in the sessions (that is, a VR helmet that makes a user feel immersed in a 3-D environment was not used). Instead, the participant entered a dimly lit room and sat in front of a relatively large screen in order to facilitate the immersion. The patient's reactions and subsequent assessments

1 Juan, M.C., Botella, C., Baños, R., Guerrero, B., Alcañiz, M., Monserrat, C., Rey, B. (in press) Augmented Reality to the treatment to phobia to small animals. First prototype and firsts treatments, IEEE: Computer graphics and applications.

of the virtual environment allow the researchers to conclude that the situation was in fact real enough and similar to her daily experiences.

The third article, *Virtual Reality Applications in Attention Deficit Disorder with Hyperactivity: An Approximation*, is written by G. Delgado from the Clinical Psychology Research Group and Quality of Life of Patients and Relatives and I. Moreno from the University of Sevilla (Spain). The authors analyze the spheres of application of VR technology in attention deficit disorder with hyperactivity (ADHD). The authors review research that spans across two decades (1990-2012), noting that VR has been utilized in the assessment and diagnosis of this disorder as well as intervention and treatment procedures (when VR is used alone or as part of multimodal programs, combined with cognitive-behavioral techniques or with neurofeedback). The authors' results show that VR is a useful and sensible tool for the detection/assessment of ADHD and in terms of treatment, the studies which made use of VR and were reviewed by the authors showed promising results.

Finally, G. Herrera, X. Casas, J. Sevilla, R. Jordan, L. Rosa, C. Pardo, J. Plaza and S. Le Groux from the Universities of Valencia (Spain), Birmingham (United Kingdom) and Pompeu Fabra (Barcelona, Spain). They presented "*Pictogram Room: Natural Interaction Technologies to Aid in the Development of Children with Autism*", a project designed to work on the key areas of development of children with autism. The project consists of a set of educational video games designed to make progress in areas such as self-recognition, joint attention, communication and relationships with others. The current version of the project on the website <http://www.pictogramas.org> incorporates a total of forty educational games focused on two dimensions of developments: body awareness and postures. According to the authors, subsequent versions

will continue with this pedagogical proposal, incorporating other educational games related to joint attention, imitation and communication. In the article, the authors provide the example of 'The Body' series, which offers several sets of activities that have been designed to favor the development of body awareness.

These four contributions represent a major advance in our knowledge of these technologies in the sphere of mental health, from the outstanding general review by Soledad Quero, Cristina Botella, Verónica Guillén and the rest of his team from the Spanish universities Jaime I de Castellón and Valencia to the specific applications in eating disorders, autism and ADHD. It will be an indispensable text for those who already make use of these technologies as well as those who are considering them.

As noted by Quero *et al.* in their article, multidisciplinary teams made up of engineers, computer programmers and therapists must work together in order to take full advantage of this potential. It is also important to reflect on the ethical issues and the implications and consequences that the application of these new technologies could have for the users.

The adjustment to ethical and legal criteria associated with the use of these technologies must be determined as they have in traditional interventions. However, the special nature of these tools make it necessary to develop new strategies that take into account all of the relevant aspects. These aspects include competence in dealing with these technologies and the analysis of which situations can be dealt with efficiently and effectively with these tools. However, it also covers more specific aspects such as informed consent (in the case of minors, the disabled and adults), avoiding harm and maintaining confidentiality.