

A. ABELLARD, P. ABELLARD. **Serious games for active ageing.** *Gerontechnology* 15(suppl):145s; doi:10.4017/gt.2016.15.s.747.00 **Purpose** Serious Games are still struggling to find their place among the tools for therapeutic use in neurorehabilitation¹, but as they enable a precise and quantified monitoring and a program for future exercises or workouts², more and more therapists and medical personnel are considering using them³. **Method** Among the Serious Games we have developed last years, three of them are presented: bowling, curling and bowl. They have been developed with the Unity 3D game engine (Unity Technologies), a computer and a sensor game (Wiimote or Kinect). The person is immersed in a 3D environment specific to each game. By applying the therapist instructions, the patient can have a real-time tracking of the gestural activity being performed. The acquisition of movements and data processing are performed in real-time. At the end of each sequence, the patient and his/her therapist have all the results shown as graphs and tables. This enables to quantify a gesture so as to correct and optimize it. **Results & Discussion** Several improvements have been observed and quantified as well as other results^{4,5}: reaction time, executive functions (visual memory and short-term memory), reasoning, spatial 3D deductive intelligence and multitasking. So, the games do not only benefit memory but also skills such as a better positioning in space, a greater visual acuity and improved hand-eye coordination which is very efficient. The mechanism of these three games is mainly based on fun, but they are useful and effective since they enable to focus on a target through a maximum concentration of the brain in a short lapse of time. Moreover, these games are easy to use, fully customizable and modifiable through Unity 3D.

References

1. Wattanasoontorn V, Hernandez RJG, Sbert M. Serious games for e-health care. In: Cai Y, Goei SL, editors, *Simulations, Serious Games and Their Applications*. Singapore: Springer; 2014; pp 127-146
2. Basak C, Boot W.R, Voss M.W, Kramer A.F. Can training in a real-time strategy videogame attenuate cognitive decline in adults ? *Psychology and Aging* 2008;23(4):765-777; doi:10.1037/a0013494
3. Dustman RE, Emmerson RY, Steinhaus LA, Shearer DE, Dustman TJ. The effects of videogames playing in neuropsychological performances of elderly adults. *Journal of Gerontology* 1992;47(3):168-171; doi:10.1093/geronj/47.3.P168
4. Alvarez J. Du jeu vidéo au Serious Game, approche pragmatique, culturelle et formelle. PhD Thesis Toulouse University; 2007
5. Alvarez J, Djaoudi D. Introduction au Serious Game. 2nd edition. Paris: Questions Théoriques; 2012

Keywords: serious games, communication, evaluation, exergame

Address: Université de Toulon – IUT – I3M EA3820, La Garde, France;

E: alexandre.abellard@univ-tln.fr



Figure 1. Pétañque game introduction screen

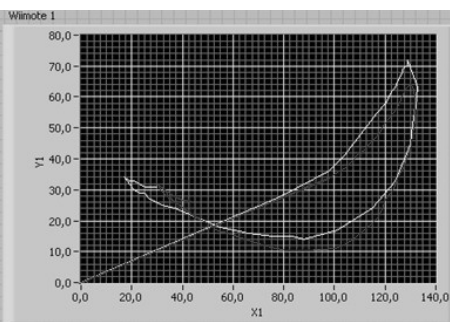


Figure 2. Example of arm movement capture during a ball launch in the sagittal plain