A Healthy Dose of Video Games

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People play games. Some play for fun while others play for the fantasy of imaginary characters and situations. Whatever the case, it seems playing games satisfies certain psychological needs (as Baranowski, Buday, Thompson, and Baranowski put in their 2008 study). Indeed, since the creation of the video game, research has been conducted to explore the psychological needs that video games satisfy. Video games are not merely looked at as simply games anymore. Thompson et al. (2010) also looked at the applications and extension of video games in other areas and noted that “…video game designers and behavioral scientists can combine their unique talents to create a highly focused serious video game that entertains while promoting behavior change.” Video games have indeed heavily influenced at least one area of study: Healthcare. Video games have impacted the field of health because of the affect they have on cognitive abilities, their use as a therapeutic tool, and their effectiveness as a source of training and education for health care professionals.

Video games are far different from most forms of media entertainment. “The hallmark of most video games is that they transform these traditional forms of entertainment [movies, books, television, et cetera] into an interactive form that enables the player to actively participate in shaping the games.” (Grodal, 2000). The interactive factor of video games gives players a level of immersion not experienced in other media. The interactive aspect of video games is a powerful tool, and the human mind certainly takes notice when it is submerged into such a responding, engaging world. A message or theme is not the only thing gleaned from a video game; the very actions that are required to play a video game can improve an individual’s cognitive abilities. Video games affect the human psyche on a general cognitive level, but also affect it specifically through spatial visualization and reaction time.

In a study done by Okagaki and Frensch (1994) spatial visualization is defined as “the mental manipulation of spatially represented objects.” Basically, it is how people can separate their attention among several sources of distractions. Many studies were done to measure individuals’ limits on spatial visualization, especially during the time the video game phenomenon swept the globe. One such study was conducted by Boot, Kramer, Simons, Fabiani, and Gratton (2008). In this study, the researchers observed a pool of non-gamers and a group of habitual gamers (known in their study as “expert gamers”) to see if video games affected an individual’s spatial visualization. The subjects were given several tasks to test their attention, which led this conclusion: “In a number of tasks, video game experts outperformed non-gamers. Experts were able to track objects moving at greater speeds, perform more accurately in a visual short-term memory test, and switch between tasks more quickly and accurately” (Boot et al, 2008). In another similar study of attention testing conducted by Green and Bavelier (2006), the conclusion was akin to Boot et al. (2008). Green and Bavelier (2006) reported, “VGPs [Video Game Players] instead demonstrate a consistently high compatibility effect across perceptual load conditions. This indicates that the VGPs continued to process the extraneous distractor even at the highest loads, suggesting an increase in available attentional resources.” Spatial visualization is not the only cognitive ability affected by video games.

In another set of studies, a correlation was made between video game playing and improved reaction time. “Playing action video games requires rapid processing of sensory information and prompt action, forcing players to make decisions and execute responses at a far greater pace than is typical in everyday life” (Dye, Green, & Bavelier, 2009). Just as researchers were intrigued at the increase in attention ability in gamers, researchers sought after other cognitive abilities that video gamers had an advantage in. In quite a few studies, a positive relationship was found between video game playing and reaction time improvement. Interestingly, video game players did not develop any extra brain muscles. A study done by Castel, Pratt, and Drummond (2005) reveals “… that relative to NVGPs [Non-video game players] VGPs rely on similar types of visual processing strategies but possess faster stimulus response mappings in visual attention tasks.” In studies like this, however, it was common to see an increase in speed, but a drop in overall accuracy. In “Increasing Speed of Processing with Action Video Games” Dye, Green, and Bavelier (2009) put those worries to rest when they conducted a study examining the relationship between reaction time and accuracy. “[The results] suggests that across a wide range of development VGPs are not more likely to make speed-accuracy tradeoffs, but are faster to respond accurately.”

Not all researchers sought the potential benefits of playing video games. Just like with any phenomenon, controversy manifested as some video games became too violent. Studies were done to determine if playing video games could foster aggression. The results may have satisfied researchers, but often left a bad taste in the mouths of those who supported video games. One study looking into aggression and video games was conducted by Anderson and Dill (2000) who concluded that “…extensive exposure to violent video games (and other violent media) contributes to the creation of an aggressive personality.” A conclusion like this is foreseeable. After all, if video games only provided benefits, would there not be a lot more support for them? Yet, the benefits of playing video games should not be overlooked or underestimated. The mere fact that video games can influence, and even improve cognitive abilities opens up a whole new world of possibilities. This is especially true in the field of health science in which video games can be used in both psychological and physical therapeutic practices.

Video games can be used as an effective therapeutic tool. Since video games affect the human psyche, they can be used in psychotherapy. Also, the development of motion control and virtual reality allow games to move into the realm of physical therapy. Fernandez-Aranda et al. (2012) researched a possible plug for video games in the field of therapy and noted, “Playmancer is an EU initiative to develop a video game prototype for treating specific mental disorders.” The basic goal of the game is to move between several islands of an archipelago to complete activities surrounding aspects medical personnel seek to change. (Fernandez-Aranda et al., 2012). The main advantage to this type of tool is simply a visual connection between a therapist and a patient. This tool could keep patients and therapists on the same page throughout the rehabilitation process, which could allow the care to proceed with ease. Video games can do a lot to benefit the human mind, but recent development in video game and simulation technology could allow video games to also be used in physical therapy.

In “The Therapeutic Use of Videogames in Childhood and Adolescence,” Griffiths (2003) comments on the reasons physical therapy is hard for some patients, and especially for children. In short, patients find most exercise routines to be monotonous and sometimes even difficult to perform; this is particularly true for victims of traumatic experiences. These findings allow videogames a foothold in physical therapy. A study done by Lange et al. (2012) found that “…using video games in rehabilitation settings has the potential to provide patients with fun and motivating exercise tools.” The fun and engaging aspect of videogames come hand in hand with another aspect that could help people who do not like hospitals. In “Virtual Rehabilitation with Video Games: A New Frontier for Occupational Therapy” Halton (2008) points out that clinical rehabilitation and therapy usually have a patient surrounded by the medical environment which includes but is not limited to bright lights, the smell of chemical cleaners, and people bustling around. A virtual reality can have a patient exist in a more comfortable and welcoming environment. In “Video Games and Health” Griffiths (2005) explains video games can be used in pain management by distracting patients with an engrossing narrative or gameplay. Video games can transport an individual into another world, where they are not limited by physical ailments. In addition, video games are helping to curb physical ailments in the real world.

Halton (2008) conducted a study concerning the motion control feature of the Wii. In the study, elderly patients of a hospital were given a scheduled videogame exercise as part of their routines. The study revealed that as the clients used the Wii-mote to play video games their focus turned from an afflicted limb to not only the game, but also to social interactions with other clients. Here, video games are being seen not only as a bridge between patients and wellness, but also as a bridge between patients and each other. Video games may provide a way to increase client participation in physical therapy, but they offer something that some physical therapy exercises don’t offer: complete safety. In a case series done by Kho, Damluji, Zanni, and Needham (2012) findings showed that “Novel use of interactive video games as part of routine PT in critically ill patients is feasible and appears safe…. Video Game therapy may complement existing rehabilitation techniques for ICU patients.” Going hand-in-hand with the fact that video games can affect people mentally and physically; video games can be used to educate health care professionals.

Video games have promising potential for healthcare education. Because video games affect the human psyche and cognitive abilities, as well as the fact that video games can be used for therapy, one can see the possibilities that video games could have as an educational tool. In “Educational Video Game Design: A review of the Literature” Dondlinger (2007) states that “… a number of [game] design elements, such as narrative context, rules, goals, rewards, multisensory ques, and interactivity seem necessary to stimulate desired learning outcomes.” Video games have the components to be a powerful tool in health education, but first one should decide if video games are effective in educating in general.

Video games can provide an engaging learning environment with problems that are practical and inspired instead of merely superficial. (Coller & Shernoff, 2009). Video games provide a space where students can apply what they learn to an environment. They can see results in a world where solving problems changes things. The solutions in these worlds are not conceptualized, they are actualized. This is especially important for children. In fact, virtual reality provides an area where children can safely apply solutions and queries. According to Brown et al (1997): “With appealing graphics and instant feedback, video games allow children to learn by trial and error in the safety and privacy of their home.” Yet, this idea can go even further. One could argue that to learn something effectively, one must think like a type of professional that would study the area. This concept was captured in “What Video Games have to Teach Us About Learning and Literacy” by Gee in 2003: “Games can show us how to get people to invest in new identities or roles, which can, in turn, become powerful motivators for new and deep learning in classrooms and workplaces.” Education in the health field can be accomplished through video games in this sense, because video games can provide a learning experience to a student through the eyes of a health care professional.

Video games can be used extensively in the field of health as an educational tool. However, when looking at the field of health, how does education support practice? In other words, how much could a healthcare student seek to gain from any education? Well, besides the fact that a student would need to learn the material to practice it, the quality of education goes a long way to separate good health care professionals from poor ones. A study done in 2012 by Cook, McAloon, O’Neill, and Beggs stated the notion that: “The delivery of effective life support measures is highly associated with the quality design and implementation of the education that underpins it.” This means that video games would need to provide an educational experience that trains health care professionals better than traditional educational techniques. In accordance with the study done by Cook et al (2012), Platform for Undergraduate Life Support Education (or PULSE), was developed to teach health students. It’s a web-based interactive tool to educate medical students on Life Support duties that showed a significant ability to successfully train students. Developments like this open yet another door for video games in healthcare education. Instead of students taking pen and paper tests on information about an area of health (like Life Support care) a video game allows them to practice what they learn in a safe environment. This is highlighted by Rosser, Lynch, and Cuddihy (2007) in “The Impact of Video Games on Training Surgeons in the 21st Century”: “Video games that require interaction with virtual reality situations - simulator training - can potentially lead to acquisition of complex real-life skills…” Video games can be an effective health education tool because they provide a safe, trial and error style world where mistakes can be looked over without materials, or accidents, to get in the way.

As can be seen, because of the interactive and immersive nature of video games, they can alter cognitive abilities like spatial visualization and reaction time. Furthermore, the engaging and welcoming virtual world presented by video games can be used in both physical and psychological therapeutic practices. Additionally, the trial and error virtual realm provided by video games allows it to be an effective educational tool for healthcare students. There is no doubt that video games have greatly impacted the field of health through the effects it has on cognitive abilities, its use as a therapeutic tool, and its potential for healthcare education.

**References**

Anderson, C. A., & Dill, K.E. (2000). Video games and aggressive thoughts, feelings, and behaviour in the laboratory and in life. *Journal of Personality and Social Psychology,* 78(4), 772-790. doi:10.1037/0022-3514.78.4.772

Baranowski, T., Buday, R. Thompson, D. I., & Baranowski, J. (2008). Playing for real: Video games and stories for health-related behaviour change. *American Journal of Preventitive Medicine,* 34(1), 74-82. doi:10.1016/j.amepre.2007.09.027

Boot, W. R., Kramer, A. F., Simons, D. J., Fabiani, M., & Gratton, G. (2008). The effects of video game playing on attention memory and executive control. *Acta Psychologica,* 129, 387-398. [doi](http://dx.doi):10.1016/j.actpsy.2008.09.005

Brown, S. J., Lieberman, D. A., Germany, B. A., & Fan, Y. C. (1997). Educational video game for juvenile diabetes: Results of a controlled trial. *Medical Informatics,* 22(1), 77-89.

doi:10.3109/14639239709089835

Castel, A. D., Pratt, J., & Drummond, E. (2005). The effects of action video game experience on the time course of inhibition of return and the efficiency of visual search. *Acta Psychologica*, 119, 217-230. doi:10.1016/j.actpsy.2005.02.004

Coller, B. D., & Shernoff, D. J. (2009). Video game-based education in mechanical engineering: A look at student engagement. *International Journal of Engineering Education*, 25(2), 308. Retrieved from <https://pdfs.semanticscholar.org/f58f/>

5a0a304709224b0fd22904f992dc1dc725ce.pdf

Cook, N. F., McAloon, T., O’Neill, P., & Beggs, R. (2012). Impact of web based interactive simulation game (pulse) on nursing students’ experience and performance in life support training – A pilot study. *Nurse Education Today,* 32(6), 714-720. doi:10.1016/j.nedt.2011.09.013

Dondlinger, M. J. (2007). Educational video game design: A review of the literature. *Journal of Applied Educational Technology,* 4(1), 21-31. Retrieved from https://pdfs.semanticscholar.org/2138/314c9bad5cd9aa5583a55a3b3eb7baaf2aaf.pdf

Dye, M. W. G., Green, C. S., Bavelier, D. (2009). Increasing speed of processing with action video games. *Current Directions in Psychological Science,* 18(6), 321-326. Retrieved from http://www.jstor.org/stable/20696060

Dye, M. W. G., Green, C. S., Bavelier, D. (2009) The development of attention skills in action video game players. *Neuropsychologica,* 47(8-9), 1780-1789. doi:10.1016/j.neuropsychologia.2009.02.002.

Fernández-Aranda, F., Jimenez-Murcia, S., Santamaria, J. J., Gunnard, K., Soto, A., Kalapanidas, E., … Tenela, E. (2012). Video games as a complementary therapy tool in mental disorders. *Journal of Mental Health,* 21(4), 364-374. doi:10.3109/09638237.2012.664302

Gee, J. (2003). What video games have to teach us about learning and literature. *Computers in Entertainment (CIE)*, 1(1), 20. doi:10.1145/950566.950595

Green, C. S., Bavelier, D. (2006). Effect of action video games on the spatial distribution of visuospatial attention. *J EXP Psychol Hum Percept Perform,* 32(6), 1456-1478. doi:10.1037/0096-1523.32.6.1465

Griffiths, M. (2003). The therapeutic use of videogames in childhood and adolescence. *Clinical Child Psychology and Psychiatry,* 8(4), 547-554. doi:10.1177/13591045030084012

Griffiths, M. (2005). Video games and health. *BMJ: British Medical Journal,* 331(7509), 122. Retrieved from <http://search.proquest.com/docview/1777630085/fulltextPDF>

/A035E32B97144949PQ/1?accountid=36328

Grodal, T. (2000) *Video games and the pleasures of control.* *Media Entertainment: The Psychology of its Appeal.* (pp. 197-213). Retrieved from http://is.muni.cz/el/1421

/podzim2013/IM082/um/grodal\_pleasures\_of\_control.pdf

Halton, J. (2008). Virtual rehabilitation with video games: a new frontier for occupational therapy. *Occupational Therapy Now,* 9(6), 12-14. Retrieved from http://www.caot.ca

/otnow/jan%2008/virtual.pdf

Kho, M. E., Damlji, A., Zanni, J. M., & Needham, D. M. (2012). Feasibility and observed safety of interactive video games for physical rehabilitation in the intensive care unit: a case series. *Journal of Critical Care*, 27(2), 219-221. doi:10.1016/j.jcrc.2011.08.017

Lange, B., Koeing, S., McConnell, E., Chang, C. Y., Juang, R., Suma, E., … & Rizzo, A. (2012). Interactive game – based rehabilitation using the microsoft kinect. In *Virtual Reality Short Papers and Posters (VRW),* 2012 *IEEE* (pp. 171-172). IEEE. doi:10.1109/VR.2012.6180935

Okagaki, L., & Frensch, P. (1994). Effects of video game playing on measures of spatial performance: gender effects in late adolescence. *Journal of Applied Developmental Psychology,* 15, 33-58. Retrieved from https://pdfs.semanticscholar.org/5219

/a91fefd128b923ca0ddc9162afc3179f05fa.pdf

Rosser, J. C., Lynch, P. J., Cuddihy, L. (2007). The impact of video games on training surgeons in the 21st century. *Arch Surg,* 142(2), 181-186. doi:10.1001/archsurg.142.2.181

Thompson, D., Baranowski, T., Buday, R., Baranowski, J., Thompson, V., Jago, R., & Griffith, M. J. (2010). Serious video games for health: how behavioral science guided the development of a serious video game. *Simulation & Gaming,* 41(4), 587-606. doi:10.1177/1046878108328087