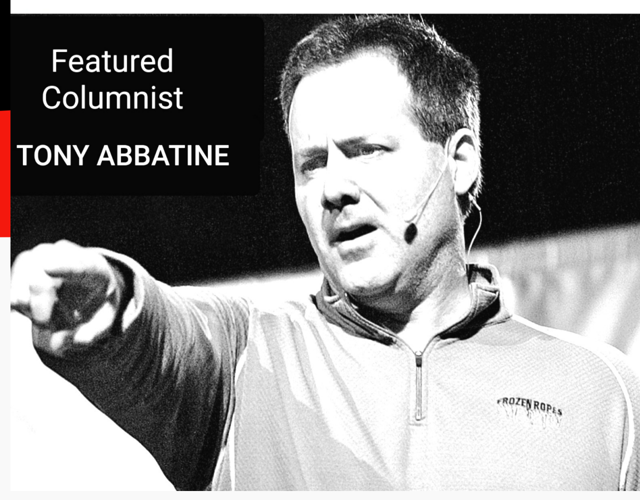
Is Virtual Reality (VR) Training Baseball's Next Performance Edge?

By Tony Abbatine on January 15, 2020



A hot topic this offseason in pro ball and the college game has been the use of Virtual Reality (VR) in improving hitting efficiency. Like all the new technology products and science-based innovations, VR comes with its proponents and critics. No one would argue that training and practicing in real and actual space and reality is the best environment to prepare. When 90 mph sinkers and unhittable splitters aren't available before a game or in the preseason, is the virtual environment a place to improve performance?

The issues still being addressed by players and organizations as the virtual environment and performance gain questions are asked are time allocation, costs, transferability and potential health risks.

Once you begin discussing neurons, the hippocampus region of the brain, dopamine and space, the baseball world can sometimes get skirmish. However, having spent the last two months learning from, and interviewing experts in the neuroscience world and getting their insight regarding VR and video occlusion training has been an eye-opening experience. The lineup of experts weighing in on VR training were impressive:

- UCLA Department of Physics and Astronomy Professor Dr. Mayank Mehta
- University of Kentucky Physiology Professor Dr. Les Anderson
- Retired US Navy Captain and Blue Angel Flight Instructor, Jansen Buckner
- Inventor, Implicit Learning Expert and founder of the V-Flex Hitting System and V-Flex Technologies, Tim Nicely

Dr. Les Anderson acknowledged there has not been enough research on the impact of VR on athletic training and added some of his own questions.

"What is not apparent is whether VR mimics reality or does VR use different/unique pathways within the brain? Some data suggests separate pathways, perhaps indicating that VR will not positively impact the ability of the brain to perceive and interpret two environments similarly," Anderson said.

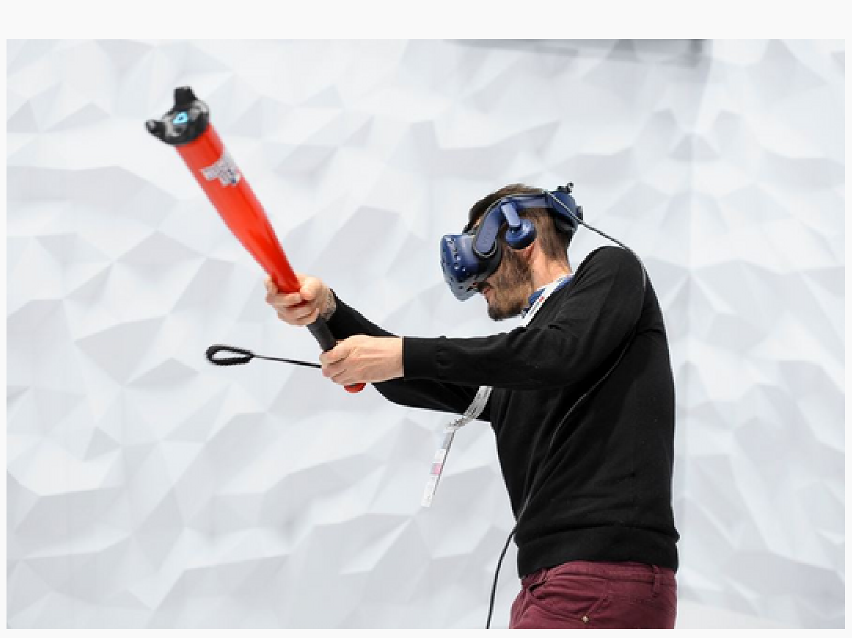
Anderson was emphatic in needing "unbiased peer review publications to determine if VR was close to replicating the billions of photons and billions of neurons dedicated to the space existing within the actual visual system of the human brain."

Retired Navy Captain Jansen Buckner who spent most of his distinguished career flying and training pilots and working with flight simulators stated his own thoughts regarding VR.

"As computers attain high processing speeds and more complex design, computer-aided training programs have obtained a more realistic graphic interface in which high fidelity images and a near real timeline has evolved into today's VR world," Buckner said.

"However, as powerful as VR is in providing a dynamic interactive training environment, there are limitations. VR always presents an artificial image in artificial space in an artificial timeline based on the design and speed of the processor. Simulation is infinitely predictable and is a function of an algorithm. Real experience is infinitely unpredictable because the human interaction is influenced by a matrix of two sets of infinite variables".

Buckner went on to share that pilots who were in VR training were not allowed to fly soon thereafter due to occasional episodes of confusion and disorientation. He also added that more research needed to be done to understand the consequences to the exposure of VR on the brain.



The recurring theme present with the experts always got back to understanding space as it exists in the human brain, and the brain's ability to remember the VR experience. Will the virtual batting practice session translate to the brain having recollection of the simulation when put back into real space and time?

The studies by Dr. Mayank Mehta took the analysis one step further. His research at UCLA on VR and its effect on lab rats (their visual system is simpler than humans) is one of the few clinical studies conducted on the effectiveness and consequences of VR. According to his study, the VR experience deactivated 60 percent of the spatial neurons during time VR was administered. During a phone interview with Mehta, additional insight was given on how VR may have an effect on memory and parts of the brain and his concern neurons weren't "firing" during VR.

"The hippocampus region of the brain is so important in learning with memory and to the extent one may be vulnerable to disease, especially Alzheimer's," Mehta said. We have to be careful, especially in children of neuro plasticity and the potential effect shutting off of these space neurons may have. Neurons that fire together, wire together."

As I heard from each of the sources, certain neurons within the hippocampus help us build maps of space so we can navigate the real world. Mehta's concern was the long-term effect of these neurons shutting down during the virtual experience. Mehta was quick to point out that he was willing to work with, and help, the VR industry learn more and improve their technology, but his efforts to reach out have gone unanswered.

Tim Nicely was the final expert contacted regarding the topic. Perhaps the most knowledgable expert in the industry on the topic, Nicely's work in implicit learning is well known in the baseball and softball world.

"New research shows that human brains in general, are more engaged when they are exposed to the outdoors," Nicely said. "If placing a person within a physical room or building has negative effects on a person's brain health, than it is fairly obvious that exposing the brain to the confines of goggles which produce and image two inches from the eyes is going to have an even more adverse effect, regardless of the strength of the illusion.

"The primary reason occlusion training (blacking out parts of the ball's flight) is non-productive is because the pitcher is on a screen. Regardless of how the images are displayed on the screen they are shown at certain calculated frames per second. This creates the illusion of movement. The pitcher and the ball only appear to move in dimensional space because of the depth that is built into the various photos being generated on the flat canvas of pixels. The screen is in essence building the illusion of depth or space."

In live game settings, all spatial neurons are providing the brain information, not just the ones targeted during the period of occlusion practice.

Much of the open focus and vision concepts that was first developed by Dr. Les Fehmi (and articulated by Manny Ramirez when he said, "when I look at nothing, I see everything" in 2005) and shared with teams is premised on the brain's desire to use space and internal runways mapped in practice to help in visual processing. Watch the pre-ball flight habits of the best hitters and pitchers in the game as they uniquely check in visually with the space around their task.

The feedback I received from players who experienced VR batting practice ranged from observations of the pitcher having a "frozen" delivery to exclamations of "this is cool!"

Will VR serve as a form of entertainment or an experience used to improve performance? Only time will tell. The health concerns, however, should be addressed before we have a generation of teens who are already glued to their iPhones spending more time focused on a screen.

At the college and pro level, it's too early to determine if strike zone mastery and timing issues can be improved in the virtual environment world. The only visual training the brain seems to want, and can remember, may be in real space and under conditions that truly simulate the flight of the ball. What's the second best form of visual training? Stay tuned to find out. Until that training is unveiled, go outside and see the ball fly through the air.

Abbatine is the author of numerous articles on player development. He has been a consultant to several Major League Baseball teams, professional players and college baseball and softball programs in the area of visual psychology and strike zone awareness training. He is currently a professor at St. Thomas Aquinas College in Sparkill, N.Y. where he teaches sports psychology. He is also the National Director of Performance for Frozen Ropes. His Website is ***www.tonyabbatine.com***