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## Virtual reality quickly turns into the game within the game

he sports world is moving rapidly to find new ways to capitalize on virtual reality technology, from developing new viewing experiences for fans, to improving player performance, to the latest innovation — advancing the level of game officiating.

Both the NBA and NFL recently indicated they are incorporating virtual reality technology into their referee training programs in an effort to make officiating more effective and transparent.

Professional leagues began exploring VR technology, which captures 180-degree and 360-degree views of an action or event to broadcast live content of games over consumers' home and mobile internet connections, in order to offer fans unique, new experiences. They soon realized VR technology also could be used in training situations to help players improve their skills.

Then, in early March, the NBA announced plans to incorporate VR technology into their training programs for referees. The league hopes VR technology will help reinforce referees' skills in new ways to help them make more accurate calls.

Plans to utilize the emerging technology, as well as other measures to improve officiating, followed a six-month review spearheaded by Byron Spruell, the NBA's president of league operations.

The NBA said it will also begin using a data-powered game review system to draft objective measurement standards for referees and to track overall call accuracy and errors made per game.

The NBA has been using VR technology for some time to help players up their games. For example, in 2015, the Washington

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Wizards began using StriVR Labs' VR technology to simulate the first-person playing experience during training. Developed by a Stanford University professor and a former Arizona Cardinals football player, StriVR Labs' technology gives the player a 360-degree view using a series of GoPro video cameras, which allows the player to "see" their actions in real time against "real" players.

The Wizards, along with Washington's NHL and WNBA teams, the Capitals and Mystics, quickly signed a multiyear partnership with StriVR Labs that year, as did numerous college and professional football teams.

The NFL is also embracing VR technology to train its officials, including the use of virtual reality simulators. In January, the NFL announced plans to develop a VR training program for its referees. As with the NBA, details about how the technology will be used to improve the NFL's officiating are scarce so far.

Teams using a VR training system, which puts quarterbacks and other players to the test while protecting them from the

risk of real-life injuries, include the reigning Super Bowl champion New England Patriots as well as the Dallas Cowboys, Minnesota Vikings and Arizona Cardinals.

The speed at which VR innovations are being adopted indicates other sports will be watching to see how NBA and NFL referees respond to VR-based training.

With sports including golf, tennis and horse racing experimenting with VR broadcasts of their own, it's likely that even modest success with referee training will be influential across the sports world.

The NBA and NFL are also VR veterans when it comes to offering fans new, high-tech viewing opportunities and their experiences could also pave the way not only for other sports to enter the VR game, but to eventually broadcasting entire seasons in VR.

Last year, the NFL partnered with VR companies including NextVR to create VR highlight packages for fans, followed by NextVR filming three NFL games in VR. According to SportTechie, NFL Films and

Google launched the first episodic VR sports program last fall, a nine-part series called "NFL Immersed" about the league and its players.

Initially available on YouTube, the series was available through the NFL VR app designed for Daydream, Google's mobile VR platform.

At the same time, NextVR helped the NBA become the first professional sports league to regularly broadcast live games in VR. SportTechie reported that the NBA signed a multiyear deal with NextVR to live stream at least one NBA League Pass game a week during the regular season.

The partners also teamed up with Turner Sports to offer fans free video-on-demand highlights in VR of the 2017 All-Star Game in February. The VR experience was available via the NextVR app as well as after the conclusion of TNT's TV coverage each night of the event.

On the business side, VR technology does pose some thought-provoking questions going forward. Will the VR experience become so realistic, not to mention convenient and affordable, that fans won't bother attending games in person?

The concept of Virtual Season Tickets, or VST, could be a financial game changer by getting fans who may never attend a single game in person to pay for the VR experience. The more than 200 million fans of the big professional sports leagues in the United States are a potentially huge market for VSTs.

But, assuming an influx of fans who are interested in paying for the VR experience and techsavvy enough to access it, VSTs could mean fewer dollars for traditional broadcasting in the future. Broadcasters appear to be preparing for such an eventuality by getting into the VR game, investing in VR tech companies.

Comcast and Time Warner were among those investing \$30.5 million in NextVR back in 2015, while Disney, ESPN's parent company, led a \$65 million fundraising round for Jaunt, another VR company.

On balance, there seems to be little downside to more, and different, uses of VR in sports. The

latest use — training referees by providing gamelike simulations in which to practice calls — seems like a good addition of VR technology in an era when officiating are being scrutinized more than ever, and fans have increasing number of digital outlets to heap abuse on refs for perceived bad calls.

According to NewSpec Sports, a website that covers news at the

intersection of sports and technology, points out: "Recreating real-time game situations with virtual reality can only help NFL referees."

The enhanced referee training could also be a public relations boon, particularly for the NFL, which is battling not only the perception of bad officiating but also other negatives, including fan frustration with the length of

games and referee video review of challenged plays.

Boosting referees' accuracy and perceived credibility with high-tech training may help win frustrated fans over. As NewSpec Sports notes: "The NFL simply has nothing to lose here."

The same holds true for the NBA and other sports that want to add VR to their playbook.