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Instant Replay in the National Football League

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Abstract

In this chapter the introduction of the Instant Replay video system in the National Football League (NFL) is analysed. The league started experimenting with video technology in 1986, which means its had more than 30 years of experience with a system similar to that approved by IFAB and FIFA in 2016. Although these are different sports, in this work the advent of technology and the evolution in NFL Instant Replay rules can be a roadmap in football. The role of the referee and the communication between coaches, referees, and TV now being discussed in football, has a long trajectory in the NFL. The NFL and its TV broadcasters have worked to find synergies to adapt league rules with the aim of improving the fan experience. However, despite its long implementation period and numerous incorrect real-time decisions overturned, there remain important voices proposing that Instant Replay should be limited, or even eliminated.

Keywords

NFL, instant replay, video technology, football,

Introduction

American football began in the 19th century with contests between college and university teams and is one of the most popular sports in United States (U.S.), with over 17 million fans attending games during the 2017 season (Lukas, 2018). The National Football League (Profootball, 2017) was founded in 1920 and at present 32 team play 16 games (for a total of 256 games) during a 17-week period.

Each team participates with 11 players, has one head coach, and an average of 15 assistant coaches. The game lasts four 15-minute quarters and each team is allowed to have 53 players on its active roster. Of these 53, only 46 players can dress out for the actual game.

When NFL was founded in 1920, it was modeled after the collegiate game for its first 12 years. In 1932, the NFL broke ranks on a few rules and appointed its own Rules Committee, charged with developing independence from the colleges and increased the number of officials to better ensure compliance and fair play.

To be considered for a position as an NFL official, candidates must have a minimum of 10 years experience officiating football, at least five of which must have been at a varsity collegiate or another professional level. The candidate must be in excellent physical condition (Alder, 2017). For their efforts, officials can earn between \$4,000 and \$10,000 a game depending upon their experience and the number of playoff games they work (CBS, 2014).

Instant replay was first used on December 7, 1963, during the popular “Army-Navy game” between the U.S. Military Academy and U.S Naval Academy. Thanks to the innovation of a 29-year-old CBS TV producer Tony Verna, football the world of American football was changes forever (Verna, 2008).

In 1976, Art McNally, then the NFL director of officiating and previously as a field judge and referee, wanted to explore how long a video review would delay a game. (NFL, 2018b). Equipped with a stopwatch and a video camera, he observed the Dallas Cowboys versus Buffalo Bills game from the press box, and he saw a missed call involving O.J. Simpson that could have been corrected. At that moment, he knew replay would benefit the league, its teams, players, and fans.

At its inception in 1986, video tapes and analogue linear systems were used to move forward and backward in the search for replays. Since then, the NFL has experimented systems to help referees correct mistakes that have “indisputable visual evidence” (NFL, 2018b).

As a result of the technological developments, NFL officials use the same NFL broadcast camera feeds and the system allows immediate labelling and recovery of plays in a non-linear way. This so allows officials to make rulings in the allotted 90.

However, despite having a wide range of cameras and a fast replay system, NFL officiating continues creating controversy and there are many important voices concerned about the system. Some of which propose to eliminate it.

Why does the use of a video replay system that has been supporting officials for more than 30 years continue creating controversy? Is it a technological problem? Is it due to an immature technology? Is it due to the lack of referees’ education? Or can it be simply as a consequence of the complexity of the NFL rules?

How are replay decisions between the referee and teams communicated? How many times replay can be used? Is there a limit? In what cases? The understanding of how replay works and the challenges that the officiating department had to deal with, can help football to anticipate some of the challenges that FIFA and the IFAB should expect.

Technological implementation in the NFL

The NFL is a league that takes advantage of the existing technology and an early adopter for technological deployment, both in the player development and in the support its officials.

Zieglemeir (2017) studied the different technologies used by football stakeholders. The coaching staff use free action cameras, such as the GoPro, that allow them to analyse the players angle of view and the position of their players as well as individual advice to perform their play. Other advances in virtual reality such as Google or Oculus virtual glasses, are used to provide players a virtual training scenario in 360 degrees.

To monitor the physical and tactical performance, NFL coaches use the "Adidas miCoach Elite Team System", which provides player physical training data such as speed, distance covered, and heart rate.

The NFL has evolved since its inception in ways that help officials “get calls right.” As such, replay is a natural development in the evolutionary process. When the NFL began as the first organized professional football league in 1920, only three officials (referee, umpire, and head linesman) were allowed. The field judge was added in 1929 and the back judge in 1947. In response to scrambling quarterbacks, and in particular to tactics of players like Fran Tarkenton, the line judge was added in 1965 to watch the opposite side of the line of scrimmage. The side judge was added for 1978, when the NFL implemented new rules to open up the passing game (Austro, 1965).

When the games were first regularly televised in the late 1940s, NFL officials felt the fans had an advantage because those in attendance could observe the replays on stadium video boards. Everyone but the referee knew what happened on the previous play. In 1975 referees were also equipped with wireless microphones and had the obligation to explain on-field rulings to a much wider audience.

“Beyond the entertainment value, the ability for fans to hear the calls added credibility to on-field rulings, increased transparency on rulings for fans and the media, and reinforced the integrity of the game” (NFL, 2018a, para. 28).

Without a doubt, TV increased the popularity of the game and enhanced demand from officials to make decisions concessions in order to satisfy fans. Conversely, increased TV presence afforded officials with an important and useful tool: Instant Replay.

First instant replay experiments

Experimentation with Instant Replay began in 1976 (NFL, 2018a). McNally, NFL supervisor of officials and key people in the Officiating Department’s transformation, tested how long a video review would delay a game. McNally also conducted a survey to know the opinion of teams. They had to grade each foul call on a seven-point scale, from poor (1) to excellent (7).

In 1978, the league tested Instant Replay during seven nationally televised preseason games. During that trial, calls remained inconclusive after lengthy reviews; McNally realized that they needed more cameras than broadcasters used for games and. After that first game, Assistant Supervisor of Officials Nick Skorich said:

“We still think we need a minimum of 12 cameras to get all the angles on every play, (...)Electronically, I don’t know if we are advanced enough yet”(NFL, 2018b).

In 1985 clubs voted to test a review system during eight preseason games. There was no unanimity in the vote. Four clubs voted against instant replay, but the 23 votes was more than the 21 votes needed to use the instant replay in the upcoming year. Also, a new vote would be need during the following offseason. Cleveland Browns owner, Art Modell, said after the vote: “[Owners] didn’t want a playoff game decided by a bad call, and so they tried to push it through right there.”(NFL, 2018b).

On September 7th, 1986, instant replay was used for the first time in an NFL regular-season game. That first season saw an average of 1.6 reviews per game for a total of 374 plays; only 10 percent of which reversed the ruling on the field (Soundavision, 2017).

The NFL Director of Administration, Joe Rhein said that “it’s possible to review instant replays and get the word to the referee on the field without a significant loss of time”(NFL, 2018b), but even that lost time was significant enough to make the game longer and slowed the tempo.

At its inception, cameras were less sophisticated than they are now, and relatively few were employed, meaning replay officials often did not get a definitive look at the play. The technology was not very refined and sometimes the field referee misunderstood the message, in one example the referee heard “Pass is complete” instead of “Pass incomplete” (Goodwin, 1986). Because of these mistakes, the league was forced to replace its walkie-talkies with pagers and radio headsets and it changed the terminology using clear terms like “confirmed” or “reversed” (NFL, 2018b).

131 In a survey conducted by CBS nearly 45 percent of the 175,000 people who voted,
132 indicated they thought replay should remain, but with changes. Another 29 percent said
133 they favored the rule as it is, while 26 percent said they opposed the rule (Goodwin, 1986).

134 A replay official monitored the live game feed from an in-stadium booth, and initiated all
135 reviews, reversing a call only with “indisputable visual evidence.” When there was a
136 question about a call, the official replayed the telecast on one of his machines as the head
137 field official was alerted to halt play. The other Video Cassette Recorder (VCR) continued
138 recording the telecast so the official could study any other replay angles shown.

139 Expressing the unknown nature of the replay booth official, Dennis Lewin, the head of
140 production for ABC Sports said, "We have no clue about how long he'll wait, or what he's
141 waiting to see" (Goodwin, 1986). Both the networks and the league emphasized that the
142 official did not dictate which replay angle he wanted to see or what order they were shown
143 in. Nor may he requested any particular shot. He merely saw what was broadcasted,
144 replayed what he wanted on his tape machines, made his call, and relayed it to the field.

145 Some executives were also concerns because the dependence on the NFL to provide
146 pictures to settle questionable calls brought with it the potential that the outcome of games
147 could be influenced directly by the producers who decide where cameras were focused,
148 which ones were attached to replay equipment, which replay angles were selected chosen
149 for airing, and in what sequence (Goodwin, 1986).

150 To address that concern, television executives asked NFL to get its own equipment and
151 highlighted that they had no problem with the theory of improving the game through
152 technology. It's was the current practice that bothered them (Goodwin, 1986).

153 In 1992, six years after its introduction, an opposition group lead by George Young got
154 enough votes to eliminate it (King, McDonough and Zimmerman, 1994, in Dudko, 2013).
155 The owners voted 17 to 11 in favour of keeping replay; which fell short of the required
156 number of votes.

157 According to McCown (2016), at that time there were two main reasons behind the
158 decision to stop the instant replay: instant replays slowed down the game too much, and
159 it failed to get enough correct calls. Freeman confirmed there was a major problem with
160 incorrect reversals (Freeman, 1992).

161 Director of Officials Jerry Seeman indicated there were nine erroneous reversals, because
162 there was not the irrefutable evidence necessary to overturn a call made on the field.
163 Seeman also said there were 12 plays that should have been reversed, but weren't. Clearly
164 there was a problem with the system.

165 Some opponents of replay claimed it caused on-field referees to be timid because they
166 wanted *to avoid the embarrassment of having their decisions overturned before a*
167 *national television audience* (Freeman, 1992). But not all agreed. New Orleans Saints
168 General Manager Jim Finks, said “I think it's a step backwards for the National Football
169 League. I think it was something we had that was very unique, very effective... I think
170 we're going to regret the day we voted it down and I think we'll have it back in, very
171 frankly” (Freeman, 1992).

172 Seven years later, Finks words rang true. In 1999, NFL decided to try replay again. New
173 advances in technology led them to believe that the new digital system would have a
174 positive impact in the replay operation because it used no-linear re-winding, said
175 Commissioner Paul Tagliabue:

"Our goal is to take advantage of advanced technology to create the most efficient replay system possible." "We believe we have developed that type of system. It uses advanced technology, but it is simple to operate. We did not want to bring back replay with the same system as 10 years ago. There will be a noticeable positive difference in the overall replay operation"(NFL, 1999, para. 2).

To make a speedy review possible, high-definition signals from all cameras were sent by fiber optic cables to the replay booth. The signals were recorded on two computer servers and cued up by a technician. A video operator transfers relevant plays to a replay monitor, which the replay assistant examines to determine if a review is warranted. A second person in the booth watches the game action, announcing to the replay assistant whether play has resumed; i.e. if it's too late to commence a review. Three monitors at field level in open-air stadiums, one of them in a runway if there is inclement weather. Just two monitors in domed stadiums.

In 2013, an agreement between NFL and Microsoft provided every team with Microsoft Pro tablets. And in August, 2017, football referees replaced the traditional monitors to the portable Surface Tablets (Darrow, 2017). "Instead of a fixed sideline monitor, we will bring a tablet to the Referee who can review the play in consultation with our officiating headquarters in New York, which has the final decision" (Sake, 2017).

In 2017, there were a total of 39,677 plays, but only 429 of those plays were reviewed. With an averaged of 155 plays per game in 2017, just 1.1% of them are adjudicated using instant replay (NFL, 2018h).

The evolution of the Instant Replay rules and principles

Since it began the NFL's instant replay review process focused on expediting instant replay reviews and "ensuring consistency."

While it was necessary to use the same television feed that fans see at home, officials also needed access to all camera views in order to isolate the best angle for consulting with replay officials and to allow referees to make the best replay decisions.

Since 1985, "indisputable visual evidence" was the standard and only those calls were reversed. Only "indisputable visual evidence" calls were revised by a replay official who was monitoring the game feed from an in-stadium booth. When replay started, NFL coaches had no way of challenging an official's on-field call, and the decision to review any questionable call occurring inside the last two-minutes came from the replay official's booth. The best a coach could hope for was that a seriously blown call might be spotted and overturned by the officials themselves (Long, 2011).

In 1986 season, reviewable plays included (NFL, 2018b):

- Plays of possession or touching (fumbles, interceptions, receptions, muffs, or ineligible player touching a forward pass);
- Most plays governed by the sidelines, goal lines, end lines and line of scrimmage (whether a player is out of bounds, forward or backward passes or breaking the plane of the goal line);
- And easily detectable infractions on replay (too many men on the field).

In 1989, the NFL decided to include every turnover and every touchdown. The protocol established also that the coach could request two reviews, except after the two-minute warning of either half, when the responsibility of calling reviews shifted from coaches to

the replay assistant in the booth. If both the coaches' challenges were successful, a third challenge was allowed. This method is still utilized thirty years later.

In 1991, After a six-season run, instant replay met its demise in 1991 when 17 owners voted against renewing the system.

In 1996, the new system approved for testing in 10 preseason games covered three categories of plays: out of bounds, number of players on the field, and scoring plays.

Also, it continued permitting coaches to challenge on field rulings. Each coach could challenge three plays per half — at the cost of a timeout per review. The league went away from using replay officials in skyboxes and gave the game official authority to review plays using a small booth equipped with monitors located on the sidelines. And, importantly, referees now had only 90 seconds to make a decision.

Despite the changes, owners voted against implementation for the 1997 regular season. The main concern was that each review costed teams a timeout, even when a challenge was successful.

In 1999, after seven years without Instant Replay, a new system with digital technology was implemented.

The new system with digital technology included four people in the box: a "replay assistant," a "technician," a "video operator," and a "communicator."

The rules were adapted to address some of the main criticisms of previous iterations.

- To minimize delays, the league cut the number of challenges from three to two per half.
- Coaches, unwilling to trade a timeout for any review, would now be charged a timeout only for unsuccessful challenges.
- To allow coaches to focus at the end of each half on calling plays not which calls to challenge — a replay assistant initiated all reviews inside the final two minutes of each half.

The system was initiated by challenges from the head coaches in all but the final two minutes of each half. During the final two minutes and in overtime, replay is triggered by the replay official in the booth with no limits to how many replays he can request. Jerry Seeman, then the NFL Senior Director of Officiating said: "Every play will be examined in case there is a coach's challenge. The booth will operate under a 'two-minute' mode the entire game, lining up replays of every play in case a challenge is issued (NFL, 1999).

TABLE 1 SHOULD BE AROUND HERE

In 2004, the NFL introduced a more low-tech solution: Coaches were given a red flag, similar to the yellow official's flag, to throw onto the field in order to make their challenge known. The instant replay rule was slightly changed to allow a third challenge to teams if both of the original two challenges were successful.

In 2016, the NFL voted to expand its current replay system to include more reviewable plays. The reviewable plays under the amendments included penalty enforcement, proper down, spot of the foul, and status of the game clock.

The league also announced that the replay official and the members of the officiating department at the league office could consult with the on-field officials during games to provide information on penalty yardage, proper down, and status of the game clock.

In the 2017 season, the league continued to consult with the game's referee and replay official from the Art McNally GameDay Central (AMGC), which was created in 2014. However, all final decisions on all replay reviews come from NFL Senior Vice President of Officiating, Alberto Riveron, or a designated senior member of the officiating department with input from the referee (NFL, 2018a).

The Coach

Head coaches have not always had the right to review the play. They can communicate with assistant coaches via a wireless headset communication device. A small number of assistant coaches are in the press box from which allows them to have an expansive view of the field. From this vantage point they can see everything happening at once. When alerted by one of the coaches in the press box, head coaches can now activate a buzzer system located in a belt pack to communicate with referees when they want a review.

The head coach also challenges a play by tossing a red flag on the field. At present, he has two per game and as indicated previously, he can use them in all but the final two minutes of each half and in the overtime period. The challenge requires the use of a team time-out. If the ruling on the field isn't overturned, i.e., the official's call stands, the team loses one of its six official time-outs.

If a team wins the challenge, it retains its time-out and the official's call is overruled. The head coach is allowed one more if the coach wins the first two challenges, according to NFL rules (NFL, 2018g):

A challenge will only be restored if a team is successful on both of its challenges, in which case it shall be awarded a third challenge, but a fourth challenge will not be permitted under any circumstances.

The debate about eliminating instant replay

Since 1985, Instant Replay has been used to overturn on-field decisions in situations with indisputable visual evidence (NFL, 2018b). The replay scope is a controversial issue, with some now arguing that replay should be used even in judgment calls or to reduce the number of missed calls. A missed pass interference call near the conclusion of the 2019 National Football Conference (NFC) championship game between the New Orleans Saints and Los Angeles Rams only heightened the cry for expanded use of replay. In fact, in March 2019, NFL owners voted 31-1 to expand the use of replay to include pass interference calls (Reuters, 2019).

The debate has been "a hot-button issue since games were first regularly televised in the late 1940s" (NFL, 2018b). With technological improvements and the ability to analyze plays frame by frame, video reviews were supposed to make ruling on plays more objective and less controversial.

The controversy reached a fever pitch after the 2014 Divisional Round playoff game between the Dallas Cowboys and Green Bay Packers. In the fourth quarter, with less than five minutes to go in the game, Cowboys wide receiver Dez Bryant made a sensational catch. After a challenge, the referees determined that "although the receiver is possessing the football, he must maintain possession of that football throughout the entire process of the catch," (Wilson, 2015), and overturned the call. The rules state that if there is even a hint of doubt, i.e., it's not irrefutable, the call on the field stands.

Two Super Bowl-winning coaches Jon Gruden and Pete Carroll manifested their disappointment to the Instant Replay system. In opinion of Coach Gruden, the NFL should "Eliminate instant replay and let the officials call the game" and "let the naked

eye make the call.” Carroll considers “The scrutiny of the officials has become so intense, they don’t call the game like they used to. I don’t like instant replay” (Boren, 2018).

Those critics notwithstanding, instant replay is so pervasive that the entire definition of a catch, a defining element of the modern game, was up for debate (Denton, 2018). It became so controversial that, in March 2018 the NFL changed the catch rule (Patra, 2018):

1. Control of the ball.
2. Two feet down or another body part.
3. A football move such as:
 - A third step;
 - Reaching/extending for the line-to-gain;
 - Or the ability to perform such an act.

Getting calls right is important, but so is keeping games exciting and watchable. This balances between keeping the rules simple and the fans, players, and coaches happy seems complicated. Trevor Denton, sport editor of the Daily Trojan, explained that the controversy is due to the frustrating ability to make games overly complicated and convoluted (Denton, 2018). Even when the NFL tries to simplify a rule, and “remove all the grey areas” as it did with the catch rule, fans, media, and teams can be left with more confusion. (Patra, 2018). Fred Gaudelli, executive producer of NBC's Sunday Night Football said, "This is my 29th year experience doing NFL games. The rules seem to get more complicated and more nuanced every single year” (Seifert, 11/07/2018).

Time Control in the Instant Replay

Since the days of Art McNally using his stopwatch to calculate how much time was needed to review a play, time control has been a very important issue when reviewing play situations.

The game itself lasts an hour, split into four 15-minute quarters, but an average NFL game takes on average of more than three hours to play (3:02 in 2008) and in the past decade, that time has up nearly six minutes (Seifert, 18/09/2018). But what fills all that screen time is different. The average number of incomplete passes, penalties called, and plays reviewed are all the same or higher, meaning we’re spending a larger percentage of those three-plus hours watching referees make decisions, players stand around, or commercials.

In 1986, the first regular season of the instant replay, officials reviewed 1.6 plays per game, 374 in total, and only 10 percent (38) ended with a reversal of the ruling on the field (NFL, 1999). During that time, reviews could be a maximum of two minutes. The time permitted for reviews was later reduced to 90 seconds and after the 2005 season, the NFL lowered the time limit for replay reviews from 90 seconds to 60. But the coaches’ challenges have the inherent capacity of slowing games down. A big downside to instant replay is the effect on game times and the pace of play. “This can serve to cool down a hot team on the verge of victory, or allow an exhausted defender a crucial extra minute or two of rest” (Berman, 2017).

Professionalism in NFL

There are some people who think bad calls or missed calls is a result of a non full-time officials. Despite significant rules and video reviews that officiating crews are required to chart each week of the season, all NFL officials meet only once a year, for what's called "The Clinic." There they learn the new rules, review plays, and get their new uniforms.

They have video footage material each season that is used by officials to analyze the plays and improve their work.

The fact that NFL game officials are not full-time employees of the league, like those in the National Basketball Association and Major League Baseball, has been recognized as a problem by the media and by NFL executives. Although most of our officials are former athletes or former players, “lot of them just started working game just to make a little extra money on the side in high school and college,” explained NFL Vice President of Officiating Dean Blandino (CBS, 2014). Prior to 2017, all officials were part-time and worked in a variety of jobs outside football; teachers to bankers and insurance underwriters to builders (O’Rourke, 2018). The NFL took action and in September, 2017 it hired 21 full-time game officials from among the current 124-person roster of officials “to promote the common goal of improving every aspect of NFL officiating” (NFL, 2017).

Technology is not infallible

The instant replay system emerged from (and was a result of) improved broadcast technology (NFL, 2018d).

In the first experiments, in 1985, the replay official was upstairs using two nine-inch television monitors and two videocassette recorders capable of recording and immediately replaying individual plays. The system worked with National Television System Committee (NTSC) space resolutions of 720 pixels compared to the 1920 pixels in the current full HD or the 3840 pixels in broadcasting tests for the new televisions in UHDTV.

High definition and high speed cameras have certainly altered how fans engage with and watch NFL games, which has led to more demands to get the call right. The resolution of the current cameras have registering speeds of more than 1,000 fps and allow operators to zoom in and analyze frame by frame with more details and determinate the accuracy of officials’ decisions. Some contend technology has changed the game for the betterment of the league, coaches and players, and even the fans.

The ever expanding and complicated communication systems used by the NFL requires important coordination by the Federal Communications Commission (FCC). In 1975 only referees were equipped with wireless microphones. Currently, wireless communication is used extensively by coaches, players, and officials use during games.

The league debuted in 2014 a more efficient wireless official-to-official communications system (O2O). The system speeds up the game by letting the officiating crew talk to each other from a distance instead of face-to-face for every penalty. Previously, the field judge would be required to run across the field to the referee to tell him the specifics of the penalty, but O2O, has created greater efficiencies. For example, “*O2O saves time when a field judge flags a clear pass interference 45 yards downfield and can tell the referee about the call as soon as the play ends*” (NFL, 2018a).

Despite those improvements, the systems are still not perfect. Frequency coordinators make sure anyone using a wireless microphone, walkie-talkie or radio is on the correct channel to allow as many people as possible to access the bandwidth they need. “That massive collision is happening in our stadiums every weekend,” said Michelle McKenna-Doyle, the league’s chief information officer. “That has to get solved — whether we buy, rent or partner with someone who owns frequency” (NFL, 2018d). Sometimes, weather conditions or stadiums obstructions make hard for technology to function flawlessly.

Technology can not always provide an effective solution. According to Brian McCarthy, NFL Vice President, “We are always looking for ways to responsibly incorporate the latest technology into all facets of the game. For a number of years we have considered various potential first-down measurement technologies but have not found one to date that we were comfortable with to deploy” (Victor, 2017).

The NFL has challenges other sports don’t face. A Hawk-Eye spokesman told ESPN in 2015 that the cluster of players around first-down and goal-line plays could make its system useless because 25 percent of the ball must be clearly visible for it to work (Victor, 2017).

Other challenges inherent to video technology is that an advantage can convert into and disadvantage, as it occurs with slow motion. According to Coach Jon Gruden:

“I think slow-mo replay is the biggest problem with replay. When you’re looking at ‘is it a catch or isn’t it a catch’ at that speed it’s hard to tell. It really is hard to tell. So I think if you threw that slow-mo out, I think you’d get back to common sense. Let the naked eye determine some of these calls. But it always looks like pass interference when you’re going that slow; it always seems to look a little bit more dramatic in slow motion. Sometimes it’s not realistic, I don’t think” (Boren, 2018).

The importance to enhance fan’s viewing experience

One of the reasons why video replay was implemented was because fans watching games on TV had access to some details of the play game officials did not. Spectators had the benefit of seeing a play dozens of times from multiple angle and hearing opinions of the commentators whose job it is to keep fans interested.

However, with the increased use of replay the fan experience is different for those watching the game on TV at home versus those watching in person. In the stadium, fans are left waiting to know whether the catch in the end zone was a touchdown or an incomplete pass. This time element breaks the act of celebration, as they often have to wait for someone else to confirm what they saw with their own eyes.

In an effort to address the fan experience concerns on March 22, 2017, NFL Commissioner Roger Goodell wrote an open letter to fans and said the league was going to try and reduce the amount of time is spent on replays. This should improve consistency and accuracy of decisions and help speed up the process.” The goal behind the change is to “achieve a competitive game with fewer interruptions and distractions from action” (Schwindt, 2017).

To coordinate actions with the officials, the TV broadcaster has a person on the sidelines with a pair of red flags used to communicate to the referee whether to go long or short on the timeout. They also use them to indicate when the network is back from commercial and play is allowed to resume, and when the network is choosing to go to commercial for a stoppage in play such as an injury or instant replay challenge.

The role of instant replay has had other impacts on its narrative event. Commercial breaks are only allowed to begin during natural stoppages in play. Generally, after scores or possession changes, but also when teams call timeouts. The teams have greatly improved the narrative, not only for viewers at home, but also to fans in stadiums. The introduction of giant video boards in the stadium offer fans a close details of players and plays. As such, fans watching the game in the stadium enjoy an experience that more closely replicates that of the fan watching the game on his or her couch.

Conclusions

The NFL has been one of the pioneering leagues in the use of video technology to help referees. The use of Instant Replay has proven to be an important tool for officials and, despite having been stopped for almost seven years, the new system approved in 1999 has remained and even improved with an enhanced digital technology which is faster than the analogue process. Coupled with greater technological support, such as the creation of the AMGC in 2014, where all the activity of review of plays and communication with the referee team has been centralized, the NFL has a strong, but not perfect replay system.

As we have seen, not all stakeholders are in favour of NFL officials using instant replay in. In spite of the criticisms, the NFL replay system has far more supporters of maintaining instant replay in all surveys consulted. Further proof of its acceptance is that in recent years, the protocol has included new play situations that were not initially considered (e.g. reviews for pass interference). The NFL has been aware of the dilemma of maintaining the essence of the game without giving up the advantages of technology and has promoted measurements to achieve the high professional standards while reducing the impact of the technology in the flow of the game.

Another aspect to highlight using video replay to help referees is the symbiosis between officiating in the NFL and television broadcasting. The officiating profession has benefited by using TV's technology and the visual language developed by sport broadcasting producers. In return, officials have offered viewers and fans more transparency in the refereeing process. TV has been able to integrate the Instant Replay as part of the football narrative or story line by making the review process or the timeout time part of the show. They've found additional revenue streams by using waiting times to introduce more commercials. Nowhere is this more evident than the coordination between the TV broadcaster and the referee to manage timeouts.

Instant Replay has been criticized by media and fans for several reasons. One of them is that the rules are still not understood. Most fans genuinely do not know what is –and isn't– a catch. The NFL has developed resources such as the NFL Rulebook with video examples for the different sections of the rules and has promoted measurements to make the rules easier to understand.

The other widespread criticism has been the lack of professionalism of the referees (i.e. that a vast majority of them are not full-time employees). The NFL has promoted measurements to achieve the professionalize of their officials by hiring full time referees and preparing annual clinic to train with the technology and review the latest changes in the rulebook.

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