Decision Review Systems within Sports:
An Investigation of Decision Review Systems within Sports and the Impact these Technologies have on Spectators

A dissertation submitted in partial fulfilment of the requirements for the degree of Bachelor of Science (Honours) in Business Information Systems

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Declaration

I hereby declare that this dissertation entitled: Decision Review Systems within Sports: An Investigation of Decision Review Systems within Sports and the Impact these technologies have on Spectators is entirely my own work, and it has never been submitted nor is it currently being submitted for any other degree.

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Abstract

Technology in sports is becoming ever more common as the technologically advancing world of today is evolving. Technology is being implemented across all areas of sports to achieve many different goals. This dissertation researches the technological tools which assist match officials of football, rugby, tennis and cricket, and the impact that these technologies have on the spectators.

This study aims to explore the relevant literature relating to this topic area, including the relationship between sports and the spectators and the usage of current technology in sports and the media. Primary research methods will be then conducted through the use of questionnaires and semi-structured interviews to gather both qualitative and quantitative data. The results and findings will then be analysed with relevant literature and secondary data to conclude the findings of the investigation.

The findings suggest these technologies are impacting the spectators in a positive manner and suggests that cricket is the sport which uses a decision review system most effectively. It has found that this technology slows the game down, but this is not an issue due to the slow nature of the game of cricket. The results also show that a mixed divide of spectators do believe that these decision review systems are slowing the gameplay down, but they also believe that the introduction of these technologies helps the spectators engage with the sport much better.
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Chapter One: Introduction

1.0 Introduction

This research looks to investigate decision review systems within sports and the impact it has on a spectators’ viewing experience. It aims to effectively use quantitative and qualitative primary and secondary data to investigate whether the forever increasing use of decision review systems, in sports, is impacting the spectators in a positive or negative manner. This research identifies and examines the use of officiating technology and how it impacts spectators across four different sports which are football, rugby, tennis and cricket. The decision review systems within these sports are goal line technology, television match official (TMO) and Hawkeye, which applies to both tennis and cricket. This study also aims to identify if these decision review systems impact a spectator differently if they were watching the sport on the television or if they were watching the sport live at the stadium. The objectives of this research will be to gather primary data by conducting a questionnaire based on this topic area, as well as conducting semi-structured interviews with sports spectators’ to provide qualitative data for this study. The primary data collected from the questionnaires will be presented in graphs and charts, making it clear for the reader. This research will also use secondary data and any relevant literature to effectively correlate the primary research findings of this investigation.

1.1 Background and History

Technology within sports is forever advancing due to the technological world of today. This technology assists match officials to make the correct decision in a game that has the potential to change the final outcome of that game/match (Technologyinsport, 2013). The first use of a decision review system within sports took place in the NFL as far back as 1985. They used instant replay technology to monitor the game inside the stadium to allow the officials to be more accurate and also add another dimension to officiating. However, this technology held many bugs and often caused delays, as well as only being able to review an incident with indisputable visual evidence (TSZ, 2016). This technology was the birth of decision review systems used in the modern day.

Goal line technology is a system used in football which determines whether or not the ball has crossed the goal line. Once the ball has crossed the line, a signal gets sent to the referee’s wrist
watch, signalling that a goal has been scored. The use of goal line technology was first approved by the International Football Association Board (IFAB) in 2012. This approval made sure that the introduction of this technology did not interfere with the actual gameplay of football itself. Today, there are 106 stadiums across the world which have goal line technology installed, which include all twenty teams in the Barclays Premier League (FIFA, 2017). Goal line technology is used in major leagues all across the world. It has also been incorporated into the Premier League in the 2013-14 season (Premier League, 2013).

The television match official (TMO) is a system used in rugby to aid the match referee to make the correct decisions. The TMO isn’t just to review a try scoring decision, it can also be used to review foul play or any other significant incidents in the match. The TMO is the first decision review system to be implemented out of the four sports being studied in this research. It was first introduced to the sport in 2001 in an attempt to reduce the amount of officiating errors involved with the sport (Feaheny, 2012). Today, TMO is used in the majority of professional games across the world including the biggest competition in rugby, the Rugby World Cup. The TMO played a crucial role in the 2015 Rugby World Cup, which was held in England, as it assisted the referee to make numerous decisions throughout the duration of the tournament (McGeechan, 2015).

Hawkeye is a technological system created by Paul Hawkins in 2001, that produces a 3 dimensional visualisation of the path of the tennis ball. The tennis ball is picked up by 10 surrounding high speed video cameras which are placed around the court. This visualisation is then played in slow motion on the large screen beside the court, allowing the umpire, players and spectators to view. It is able to determine whether the ball actually landed inside or outside of the court. Hawkeye was deemed fit for professional use in 2005 by the International Tennis Federation (ITF) and the first major tennis tournament to use Hawkeye as a decision review system was the 2007 Australian Open which allowed players to be able to challenge line calls (sportsworldintel.com, 2012). Today, Hawkeye is used in tennis across the world in over 80 tournaments. This technology also has the potential to determine whether a player has committed a foot fault or not (Hawkeyeinnovations.com, 2017).

Hawkeye is also a key officiating tool used to assist the umpire in cricket, as well as tennis. This decision review system is able to track the path of the ball whilst it is being bowled. It is able to track the path due to the high speed cameras which are strategically located around the pitch. Hawkeye is used when the umpire believes there may have been an LBW (leg before
wicket) incident. Hawkeye will then display a slow motion 3 dimensional visualisation of the projected path of the ball on the big screen which allows the umpire, players and spectators to view. This will show whether the ball would’ve struck the wicket if it didn’t hit the batsman on the leg (Steen, 2011). This technology was first introduced into the world of cricket in 2001 in a test match between England and Pakistan, and was then approved by the International Cricket Council (ICC) in 2008 (Hawkeyeinnovations.com, 2017).
Chapter Two: Literature Review

2.0 Introduction

This chapter identifies the relevant literature surrounding the use of all kinds of technology within sports. It will begin with technology in sport which will then lead onto technology aiding the officiating of sports. It will then look at the relationship of sports and entertainment and the effects on the viewer due to these new technologies within sports. This chapter will look at articles, journals, books and reports

2.1 Technology in Sport

The majority of sports have developed and evolved over the last decade by implementing a type of technology to advance the sport itself. These technologies are able to improve the athletes’ performance by thoroughly analysing their techniques/performance, produce optimum sportswear to give athletes an advantage, improve the refereeing decisions using decision review systems and more.

A study was made by Loland (2009) discussing the ethics of performance enhancing technology within the world of sport. During this study, he analyses four different technologies within sports; body techniques, sports equipment, training technology and expert administrated technologies. He finds that new body techniques for an athlete to achieve greater sporting goals can cause value conflict at the time of introduction of these new techniques from a conservative and puristic minority. He also looks at the introduction to new sporting technologies and argues how the development of these technologies also cause controversy as the developments have led to a “de-skilling” of sports. He suggests that training technologies are acceptable if they don’t provide harm to the athlete. He finally argues that expert administrated technologies don’t require any effort or control from the athlete.

Another study has been made by Loland (2002) which examines various types of sports technology from the perspective of three normative theories of competitive sport. The three normative theories which have been used in this study are the non-theory, the thin theory and the thick theory. He states that the non-theory accepts any kind of sport technology for an athlete to achieve any of their external goals. He also states that the thin theory requires equal opportunities in competitions for all athletes with an acceptable technology being a performance-enhancing technology for this specific theory. He finally states that the thick
theory does not just require equal opportunities for all competitors but also that sport should adhere to moral values for human self-development and flourishing. This theory, is the only theory that leads towards a sound ethics of sports technology.

Sidhu (2011) states that the introduction of technology within sports has multiple purposes from, the way people watch sports, all the way through to the statistical analysis of an athletes’ performance. Statistical analysis is used to eliminate all subjective analysis. The work then analyses statistical analysis by using methods from Markov Chains, Bayesian Inference and Markov Chains Monte Carlo. They found that with cheap computation, it is possible to improve the results that statistical analysis provides with the introduction of artificial intelligence. He has found this by using Neuro Dynamic Programming when evaluating football. This is a control theory paradigm which is based on theory in Stochastic processes.

Dyer (2015) produced a systematic review of the controversy of sports technologies. He discusses the introduction of new technologies and equipment across various sports and how this affects the nature of the sport itself and also an athletes’ performance within their sport. The study states that the introduction of ‘spaghetti’ strung rackets to tennis led to a re-skilling of the game. The tennis governing body then decided that this technology compromises the athletic challenge of the sport itself and therefore banned this specific technology (Sheridan, 2006).

A study has been made by Miah (2006) which investigates the use of human enhancement technologies within sports. This study investigates the controversy behind the ‘square’ grooved golf clubs. These golf clubs enable a golfer to maintain a more accurate and consistent strike of the ball. Similar to Loland (2009), he argues that this lead to a ‘de-skilling’ of the sport. The PGA also thought that this was the case and had these type of grooves removed from the sport as it reduced the skill required to play the game.

2.2 Technology Refereeing/Officiating

A previous study has been conducted by Fischetti (2007) which analyses the individual review systems such as TMO, Goal line technology, Hawkeye and UDRS. He has identified that Hawkeye is a major tool for professional tennis tournaments. Hawkeye has the ability to track the ball at high speeds to see whether the ball has landed in or outside of the court of play. This technology has the ability to track the ball due to the 10 video cameras surrounding the court which feed 24 gigabytes of data to video-processing software which is able to track the real
time positioning of each shot. This study looks at the actual technology in the game but doesn’t mention how it actually affects the game unlike Lai and Yu-Ling (2007). Their research looks at the effects and impacts of the review system on the game as a whole, as it also looks at the effects of broadcasting the game onto television. They state that Hawk-eye will produce an extremely important effect on the game of tennis due to the sports characteristics, broadcasting nature and referee ruling. They argue that Hawk-eye will take TV broadcasting to the next level as it provides a different perspective for viewers. They also state that this technology will help players improve their skills, accelerate the course of the game, increase liquidity and continuum during competitions, promote a new level of refereeing, provide accuracy to the game and also give the audience and players a new point of excitement.

There are also problems with the decision review systems which is Hawk-eye. Stich (2007) states that the technology isn’t effective enough to be used in tennis. This is due to the margin for error that Hawk-eye holds, which is 3.6mm. There was an instance where Hawk-eye called the ball out by 1mm during a match with Roger Federer and Rafael Nadal which cause mass controversy and debate about the technology within the sport (Hawkins, 2007).

A study was made to detect goals accurately in football, this study was made before the current goal line technology was introduced. The study presents a technique for detecting goals during a football match. This technique works using a single camera placed externally to the field, this camera will be able to pick up whether the football actually crosses the goal line by comparing the position of the ball in relation to the woodwork. This method relies on a supervised learning scheme which is called support vector machines. The advantage of using this method is that modification of the posts or the ball is not needed, as it is using images acquired by a single camera placed externally to the field (Ancona et al, 2001).

A video technology system has also been recently introduced in football. The system was trialed in a friendly match between France and Spain. This new decision review system proved its worth in this game, as it helped the referee make the correct decision on two crucial occasions in the second half (Matthews, 2017). The Telegraph (2017) believe that this new technology is the future of football due to its ability to look back on events to provide an accurate and reliable decision of an event in the game. They also state that this technology works by the video referee alerting the match referee through a microphone when they notice an incident. The video referee will then review the incident and inform the match referee of the
correct decision. It is also argued that this new technology will ruin the atmosphere of football due to the delay waiting for the decision to be made (Pulse.ng, 2017).

A study has been made which compares the video review system of cricket, to the one of tennis. This research has been written by Evans (2012) and looks at how cricket uses HawkEye effectively compared to how tennis uses the review system ineffectively. He states that the new, emerging technologies of visualisation and measurement are changing the relationship between spectators and officials in tennis and cricket. This is due to the increasing scrutiny that these officials find themselves under, thus the governing body of the sport are attempting to introduce more technology to relieve this pressure off of the officials. This study also examines the way in which uncertainty and indeterminacy are conveyed to the viewers and spectators. This study looks at how the new technologies are being used in sports (mainly cricket and tennis) and posts new ways to implement these technologies whilst maintaining the traditions of sport, keeping the rivalry and intensity in the game.

Another study has been made by Collins (2012) which looks at the philosophy of umpiring and the introduction of decision aiding technology within a number of sports. The study goes into depth about how the introduction of technology has impacted the umpiring and refereeing of sports. He states that a major effect of the introduction of technology on officiating is that it has entitled new groups of people to make judgement on refereeing decisions. These new groups of people include any viewer on television or commentators, whereas before it was only the players and the crowds. He suggests that this new change is also a positive as it has brought a new perspective to sports. He also argues that the introduction of new technology should be implemented in a way which maintains the justice of decisions, this is not the same as accuracy. He suggests that the justice is best introduced with a restrained use of these technologies.

2.3 Sport and Entertainment

Sports is an ever growing concept and essentially a major money making scheme for many major businesses. Major broadcasting companies compete with each other for the rights to be able to broadcast certain sports. BT have recently beaten Sky in the bidding process and retained the exclusive rights to broadcast European football until 2021 for £1.18 billion (Dean, 2017). TV broadcasting deals are even bigger in the USA. In 2013, Fox, NBC and CBS all joined together for a deal for exclusive television broadcasting rights for the NFL until 2022.
for a combined $27 billion (Badenhausen, 2011). Wimbledon also plays a large role in sports broadcasting with 13.3 million people spectating the 2016 final (BBC, 2016).

The history of sports broadcasting has changed dramatically over the decades. Football in the UK was originally broadcasted by the BBC and ITV at a fee of £2.6 million during the years 1983-85 (Gratton and Solberg, 2007). This later saw a dramatic increase of broadcasting fees as Sky won the bid for 60 live premier league games in 1992 for £38 million a year. This later saw another dramatic increase as Sky then paid £2.2 billion for even more premier league matches during the period of 2001-2007 (Gratton and Solberg, 2007). This deal has even further increased. Sky and BT have joined in a deal to broadcast live premier league games from 2016 to the 2018/19 season for a combined £5.3 billion (Chaudhary, 2016).

Coakley (1994) states that sport and the media have grown together as one and without each other, they would be extremely different in the present world. He argues that commercial forms of sport would not be so widespread and that there would be less emphasis on elitist forms of sport (the Olympics, world championships). Coakley (1994) indicates that the relationship between sports and television has been built and developed within a large cultural context creating mass commercial profits through sponsorships, advertisement deals and a diversified collection of spectators. Galily and Tamir (2014) describe the relationship between sport and the media as a “match made in heaven” in their recent study. They also agree with Coakley (1994) and suggest that sports and the media will not be able to grow and develop without one another. They state that sports and mass media, have been mutually constituted by each other to gain economic profits.

2.4 Technology and the Effect of Participant Viewing Experience

Lewis and Gantz (2014) examine a series of platform and lifestyle factors that are likely to shape sports fans’ use of traditional and newer digital media to engage with certain sports. They state that television will remain as the medium choice for sports fans to view live sports. Lewis and Gantz (2014) also suggest that sports fans will use newer and more adapt technology to enhance their sports viewing experience. They suggest that these newer media technologies will include devices such as laptops, tablets and smartphones due to their ease of use and mobility. Mobile TV has become increasingly more popular when its user interface was similar to more traditional media and technology (Kaasinen et al. 2009).
Vanessa Roger Monzo (2015) has studied the evolution of television sports broadcasting through new technologies that have emerged in the industry. She identified that the first football matches in Spain were only broadcasted using three different camera angles. Vanessa Roger Monzo (2015) states that the introduction of new technologies has influenced the conduct and narrative structure of football broadcasts.

Major broadcasting companies are always developing their display options and incorporating new technologies to enhance a spectators viewing experience. Sky offer a red button service which allows a user to customize their viewing experience by enabling a split screen feature to be able to watch two different sports at any given time. There is also a feature that sky offers to its customers which allows users to change the viewing angles of the sport (Sky, 2017). Sky also have a feature, called ‘Sky Go’, which allows users to be able to watch live sports on their devices (tablets, laptops or smartphones) as long as they are connected to the internet (Sky, 2017).

Another feature which has been introduced to enhance the spectators viewing experience is the use of data visualization. This is primarily used in the US and creates a visual dashboard on screen showing multiple facts and statistics relevant to the sports showing on screen (Clarke, 2016). Clarke (2016) also suggests that good example of data visualization is NBA Pulse which shows fans statistics of which players are most popular on social media during the game.

Tang and Cooper (2012) states that the Beijing 2008 Olympics were the most watched television event in US history with over 217 million viewers due to the new media and the various media platforms available to the public eye. Tang and Cooper (2012) also state that the 2008 Beijing Olympics was the ‘first truly multiplatform Olympics’ and was also a financial success for NBC Universal as they were the main broadcasters of the event in the US.

Woods (2011) has studied the way in which technology has changed the way a spectator experiences sport. He states that CBS Sports and NCAA offered an on-demand website for the first day of the NCAA’s men’s basketball tournament. Woods (2011) finds that the website had the largest online traffic for a sports event with 3.4 million hours of online streaming by 3 million viewers. One of the main features that this service provides its users is a ‘boss’ button. This button allows users to press, to quickly hide the screen that they were watching the basketball on. This was button pressed 1.7 million times on the first day of the website (Woods, 2011).
Coakley (1994) states that many owners of professional teams believe that television coverage is affecting game attendance. Research backs this statement up as half of the people interested in the sport would rather watch the game on a television than watch it live at a stadium (Fasting, 1977). Coakley (1994) then argues how the media also publicize and promote sports events to gain interest and also display information about athletes and teams for people to be able to become committed fans.

2.5 Literature Review Summary

This chapter has used books, articles, journals, reports and websites to gather key literature surrounding relevant topic areas. This chapter has looked at the current technology used within sports as a whole, as well as the positive and negative implications of using decision review systems to aid officiating within sports. It has also looked at the ever growing commodity of sports and entertainment and how sports and the media need each other to develop and grow. Finally, this chapter looks at how this new technology effects the participants viewing experience as this is the main basis of this study. It identifies many different technologies that have been introduced within the world of sport and how users interact with these technologies.

The next chapter will look at the research methods taken to collect information for the researcher to conduct this study.
Chapter Three: Methodology

3.0 Introduction

This chapter will look to explain and identify the research methods which are set to be used for the duration of this study. It will provide detailed descriptions of the reasons why these research strategies have been chosen, and why these strategies will lead to the best results. The methodology will also explain the objectives of the overall study and how gathered data will be analysed, providing the student with a set of accurate results.

This study will use primary and secondary data to gather all information required to meet the objectives of this study. Using primary and secondary data will provide the student with different viewpoints and a more whole understanding of this topic. This study will also be collecting a mix of qualitative and quantitative data to provide detailed and accurate responses.

Quantitative research is mainly associated with positivism and is used with predetermined and highly structured data collection techniques (Saunders et al, 2012). Denzin and Lincoln (2005) suggest that qualitative research is associated with an interpretive philosophy. This is because researchers need to understand subjective and socially constructed meanings describing the topic being studied (Saunders et al, 2012).

There were two methods used to retrieve primary data for the data gathering of this study. The methods used were online questionnaires and semi-structured interviews. Questionnaires were used to provide the student with a mix of quantitative and qualitative data and semi-structured interviews were used to provide the student with qualitative data which expands the data from the questionnaires in greater detail. The secondary data was collected from numerous articles, books, journals and websites. This data is used to provide the student with greater knowledge and understanding of the topic area.

3.1 Questionnaires

A questionnaire is a cost effective research tool for data collection (Jack and Clarke, 1998). Questionnaires tend to be used for descriptive or explanatory research that uses attitudes and opinions of its participants. This will help to identify and describe the variability in different phenomena (Saunders et al, 2012).
Questionnaires were the main method in data collection for this study, due to the high response rate and how effortless it is for a participant to complete. To complete the aim of this study, the student will need to devise a questionnaire surrounding the participants view and experiences with decision review systems when watching their chosen sport on television or at the stadium. The student has chosen to gain qualitative and quantitative primary data through the use of a web-based questionnaire, the questionnaire will be self-administered online using Cardiff Met Qualtrics. A self-administered questionnaire means that the student doesn’t need to be in the company of the participant when they are completing the questionnaire. Due to this method, the participant is able to complete the questionnaire in a comfortable environment and answer honestly as they may not be persuaded to choose a certain answer based on the student’s behaviour. The participant can also take their time completing the questionnaire as they will not be rushed in any way. The questionnaire will be published on multiple sports forums and also the researcher’s social media.

There are many advantages to using a web-based questionnaire as the main method to collate data for this study. The first advantage is that it is easy to process all data effectively as Cardiff Met Qualtrics can identify the answers due to the fixed option choices. The choice of closed questions for this questionnaire also makes it easier for participants to complete as they are not expected to write extensively and instead just select options (Bryman and Bell, 2003). Another benefit that using a web-based questionnaire for this study is its cost effectiveness. As there aren’t any paper based documents, it is reducing costs massively as well as protecting the environment (Jack and Clarke, 1998). Bachmann and Eflrink (1996) also suggest that using this quantitative method would entitle the researcher to be able to mass distribute the questionnaire geographically in minimal time. This will be able provide the researcher with different perspectives from all over the world. The self-administered questionnaire also allows the participant to take their time and not be nervous as they will be comfortable in their own environment.

However, using web-based questionnaires also have their drawbacks, as there may be a loss of spontaneity in the respondents’ answers as they may overthink the question asked (Bryman and Bell, 2003). This can then lead to the respondent not being truthful with their answers (Milne, 1999). Popper (2014) believes that using a questionnaire is inadequate to understand some forms of information such as emotions, feelings and even the respondents’ behaviour. It is also argued that the use of self-administered questionnaires carries the risk of more missing data as the non-completion rates are significantly higher. It is also suggested that high
3.2 Questionnaire Design

The design of the questionnaire is extremely important, as if it is wrongfully designed, the researcher may not achieve the required results. It is vital that all questions are clearly written so the participant can understand the question in exactly the same way as the researcher has intended (Foddy, 1994). The use of standardised questions will make the researcher confident that the questions will get interpreted by the participant in the correct manner (Robson, 2011).

The questionnaire (Appendix A) holds a total of 16 questions and is aiming for 80+ completed questionnaires from participants. All questions asked on this questionnaire are multiple choice, closed questions. Using multiple choice questions will make it quicker and easier for the participant, as well as avoiding all risk of human error during completion. On two of the questions towards the latter end of the questionnaire, it is visible that the participant will be required to input their opinion if they select a certain answer to the specific question. It is important to keep questions closed as open-ended questionnaires are not consistent or particularly good for research that requires large numbers (Saunders et al, 2012). Skip logic has also been incorporated into the questionnaire to improve the flow of the survey, as it is unnecessary for a participant to complete questions which wouldn’t suit them. Skip logic also improves the data itself as it is more accurate and valid due to it skipping questions which are not valid for the participant. Participants are able to complete the questionnaire on a computer, tablet or even a mobile phone as the questionnaire is set up to work on most major operating systems.

3.3 Semi-Structured Interviews

A research interview is a conversation between two or more people, where the interviewer asks purposeful concise questions that result in accurate and useful qualitative information which will contribute towards the researcher’s study (Saunders et al, 2012).

Bryman and Bell (2003) state that a semi-structured interview “typically refers to a context in which the interviewer has a series of questions that are in the general form of an interview schedule but is able to vary the sequence of questions.” The semi-structured interview aims to provide the researcher with in depth qualitative data which they can use to back up their
findings from the main method of data collection in this study, which is questionnaires. To reach the aim of this study, the student must create a semi-structured interview which discusses the participants’ personal experiences they have encountered with the use of decision review systems in their chosen sport. It is important to interview participants with different sporting interests to be able to generate a wider knowledge of the four chosen sports for this study (football, rugby, cricket and tennis). The qualitative data will be analysed by identifying patterns in the interviews as this data is often associated with an interpretive philosophy (Saunders et al, 2012).

3.4 Semi-Structured Interview Structure

The type of interview conducted in this research was semi-structured interviews. The questions for the semi-structured interviews were based on the web-based questionnaires, as the aim of these interviews was to provide in depth qualitative data that would be able to help the researcher expand on any points or arguments made when analysing the questionnaire results. The use of semi-structured interviews will make the interview flexible so that the researcher can ask appropriate questions according to the answer the interviewee provides.

When executed correctly, the researcher will be able to extract more qualitative data to support the findings of the study. The interviews will cover the interviewee’s personal experiences and feelings towards decision review systems in their chosen sport.

Altogether, 5 interviews were conducted (Appendix B) with participants of random ages as the researcher is not really taking age into consideration in this study. The 5 participants covered all four sports which are being analysed in this study, which gave the researcher a full perspective from fans of each sport.

Each interview was a one to one interview with the interviewee and researcher. These were recorded by the researcher to hold all information that was discussed and all interviewees will be kept anonymous. The interviews will last approximately between 5-10 minutes as this time frame allows the researcher to extract all the necessary information out of the conversation without the interviewee getting bored or losing focus which has the potential to jeopardise the given information. The interviewer must also remove any bias when asking questions or prompting answers to maintain the validity and accuracy of the qualitative data.
3.5 Triangulation

Triangulation is the use of different data collection techniques within a study to combine data to verify whether the findings from one method mutually corroborate the findings from another data collection method (Saunders et al, 2012). In this study, the researcher is using triangulation for the web-based questionnaires and semi-structured interviews. The qualitative data which is collected from the semi-structured interviews is a valuable method of triangulating the quantitative data which is collected by the web-based questionnaires.

Both methods hold their own strengths and weaknesses. The questionnaire is very factual as it asked participants whether they feel decision review systems were helping their chosen sport but due to the nature of multiple choice questions, they were able to express their attitude but unable to explain their reasoning. The semi-structured interviews allowed the participants to then express their opinions and explain their reasoning as of why they feel that way towards decision review systems. This is due to the nature of the more open-ended questions and continuous comments by the researcher to gain the qualitative data.

The advantages of using triangulation are that it enhances the understanding of the research, providing a more ‘complete’ picture of a phenomenon. It also produces a fresh insight on the research and reduces any bias or flaws (Kwok, 2012).

3.6 Ethics

The researcher had to undertake ethical procedures (Appendix C) to gain clearance in order to collect any primary data from the questionnaires or the semi-structured interviews. It is vital that this clearance is gained before the collection of primary data, so that the researcher does not breach any of Cardiff Metropolitan University’s legal or ethical obligations. It is also to prevent the researcher offending any participants in any way.

To continue with the questionnaire, a participant must read the information sheet (Appendix E) provided by the student and click the consent button. Similarly, with the interview, a participant must fill in a consent form (Appendix D) which agrees to the participation and the recording of the interview. These information sheets and consent forms clearly state that the participant is free to drop out of the research at any time if they feel uncomfortable or do not wish to continue. All participants will remain anonymous throughout this study.
3.7 Data Analysis

The data gathered from the questionnaires will be analysed using Microsoft Excel. The data will be presented into charts and graphs which clarifies the findings. The use of charts and graphs will present the data in a format which is easily readable to the user. The researcher will be examining the mode of the data to identify the sports fans’ preferences with decision review systems within sports. Patterns and trends will be found in the data collected from the interviews. These patterns and trends will triangulate the questionnaires’ findings. These patterns and trends will also be presented as quotes and will reference the relevant appendices.

The next chapter will analyse all the information gathered from the interviews and questionnaires. This information is then discussed, identifying any specific patterns, similarities or correlation within the data.
Chapter Four: Findings and Discussions

4.0 Introduction

This chapter will state the findings from the primary research which gathered qualitative and quantitative data from the questionnaires and semi-structured interviews. The discussion section of this chapter, will also justify the findings gathered and explain the reasoning of these findings. These findings will also be discussed using relatable literature and also secondary data which is related to the specific topic areas. This will summarise particular findings.

4.0.1 Questionnaire

The questionnaire in this study was conducted for a duration of 6 weeks from the middle of February, to the end of March, and returned 83 completed surveys. These questionnaires were completed online using Cardiff Metropolitans Qualtircs Survey software. The questionnaire was split into three different topic sections. The first section, identified the participants’ age and the sport they are most interested in. The second section, identified how the participant felt when they witnessed a decision review system in their chosen sport and how they felt this decision review system impacted the game. Finally, the third section identifies how the participant feels the decision review systems are impacting their chosen sport as a whole.

Figure 4.0.1 displays the whole of the questionnaire with the results shown in percentages. The figures highlighted in red, displays the majority vote of the chosen question.

**Figure 4.0.1. Questionnaire results**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is your age?</td>
<td>18-26</td>
<td>71%</td>
</tr>
<tr>
<td></td>
<td>27-35</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>36-45</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>46 or older</td>
<td>12%</td>
</tr>
<tr>
<td>Which sports are you most interested in?</td>
<td>Football</td>
<td>39%</td>
</tr>
<tr>
<td></td>
<td>Rugby</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Tennis</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>Cricket</td>
<td>16%</td>
</tr>
<tr>
<td>Are you a regular viewer of the sport selected in Q2 on television?</td>
<td>Yes</td>
<td>83%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>17%</td>
</tr>
<tr>
<td>Have you ever witnessed a decision review system (Hawkeye, TMO or goal line technology) in action on the television?</td>
<td>Yes</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1%</td>
</tr>
<tr>
<td>Question</td>
<td>Choice</td>
<td>Percentage</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Did it make a positive or negative impact towards the game/match?</td>
<td>Extremely Positive</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>Somewhat Positive</td>
<td>37%</td>
</tr>
<tr>
<td></td>
<td>Neither Positive nor</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Somewhat Negative</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Extremely Negative</td>
<td>0%</td>
</tr>
<tr>
<td>Did you feel it slowed the game down?</td>
<td>Yes</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>62%</td>
</tr>
<tr>
<td>Did you feel it helped you as the spectator, to engage with the game</td>
<td>Yes</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>18%</td>
</tr>
<tr>
<td>Have you ever witnessed a decision review system (Hawkeye, TMO or goal</td>
<td>Yes</td>
<td>46%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>54%</td>
</tr>
<tr>
<td>Did it make a positive or negative impact on the game/match?</td>
<td>Extremely Positive</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>Somewhat Positive</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>Neither Positive nor</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Somewhat Negative</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Extremely Negative</td>
<td>0%</td>
</tr>
<tr>
<td>Did you feel it slowed the game down?</td>
<td>Yes</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>46%</td>
</tr>
<tr>
<td>Did you feel it helped you as the spectator, to engage with the game</td>
<td>Yes</td>
<td>84%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>16%</td>
</tr>
<tr>
<td>Do you believe the increase of decision review systems are improving</td>
<td>Yes</td>
<td>96%</td>
</tr>
<tr>
<td></td>
<td>No, please specify why</td>
<td>4%</td>
</tr>
<tr>
<td>Do you believe that the overuse of decision review systems are</td>
<td>Yes, please specify the</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>sport and why</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>76%</td>
</tr>
<tr>
<td>Do you agree with the argument that decision review systems are</td>
<td>Yes</td>
<td>28%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>72%</td>
</tr>
<tr>
<td>As a spectator, would you rather the sport be officiated 100% accurately</td>
<td>100% accurately with</td>
<td>69%</td>
</tr>
<tr>
<td></td>
<td>but with breaks in the</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td>flow of the game due to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stoppages or would you</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rather it flow freely</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and let the referees</td>
<td></td>
</tr>
<tr>
<td></td>
<td>officiate the game</td>
<td></td>
</tr>
<tr>
<td></td>
<td>by themselves?</td>
<td></td>
</tr>
<tr>
<td>Would you rather watch sports live on television or live at the</td>
<td>On television</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>At the stadium/arena</td>
<td>67%</td>
</tr>
</tbody>
</table>

4.0.2 Semi-Structured Interviews

The data gathered from the semi-structured interviews will triangulate the data received from the questionnaires. In total, five interviews were formally conducted with participants of mixed
ages and mixed sporting interests. The answers gathered from the respondents were extremely detailed, which means that it is critical that this qualitative data is analysed effectively. The results from the semi-structured interviews will also be discussed in the discussion section and be supported with relevant literature and secondary data.

4.1 Questionnaire Analysis

Overall, 83 participants took part in the online questionnaire. Figure 4.1 displays the age range of these participants. This pie chart shows that the majority age that participated in this study is the 18-26 range, with 71% of participants coming from this age group. It also shows that only 6% of this population were in the age bracket of 36-45.

As this study analyses the effect of decision review systems on the participant in different sports, it is critical identify which sports the participant favours. Figure 4.2 identifies which sport the participant is most interested in. This questionnaire will then be based on the participants chosen sport. Figure 4.2 shows that the majority chose football with 32 votes, whereas cricket only had 13 responses.
4.1.1 Football

Figure 4.3 shows that out of the 32 football fans who took part in this questionnaire, 26 of them are regular viewers of the sport on television and 6 of them are not.

Out of the 26 participants who are a regular viewers of football on the television, Figure 4.4 shows that 25 (96%) of the 26 participants have witnessed goal line technology in action whilst watching football on the television.
Figure 4.4. Football viewers who have seen goal line technology in action on the television

Figure 4.5 shows that out of these 26 regular viewers of football on television, 50% of these feel that this decision incident made an extremely positive impact on the game and 38% feel that it was somewhat positive to the game. 0% of all participants felt that this technology didn’t make a negative impact in any way.

Figure 4.5. Did the goal line technology impact the match
Figure 4.6 shows that only 4 television viewers believe that the goal line technology slowed the game down, whereas 22 viewers did not believe that it slowed the game down.

Did the goal line technology slow the game down?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

**Figure 4.6. Effect on speed of play of football on television**

Out of these participants, Figure 4.7 shows that this decision review system does help a spectator engage with the game more by watching it on televisions as 22 out of the 26 spectators engage with the game better.

Did you feel it helped you as the spectator, to engage with the game better?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22</td>
</tr>
</tbody>
</table>

**Figure 4.7. Number of respondents who feel goal line technology helps to engage with football through television**

Out of the 32 football participants for this questionnaire, Figure 4.8 shows that only 6 have witnessed a goal line technology incident in a stadium.
Figure 4.8. Number of participants who have witnessed goal line technology in a stadium

Figure 4.9 shows that the majority of these viewers at a stadium, feel that this decision incident made a positive impact on the game with a total of 66%. It also shows that 17% of these participants feel that this decision incident made a somewhat negative impact on the game.

Figure 4.9. Participants opinion on impact of goal line technology on the game at the stadium
Figure 4.10 shows that 4 (66.66%) of these participants didn’t feel that this technology slowed the game down whereas the other 2 (33.33%) did feel it slowed the game down.

Out of the 6 football spectators that have witnessed goal line technology in action in the stadium, Figure 4.11 shows all 6 (100%) felt this technology helped them to engage with the game better.
4.1.2 Rugby

Figure 4.12 shows that out of the 22 rugby fans that partook in this questionnaire, 17 of them are regular viewers of rugby on television. The other 5 participants are not regular viewers of rugby on television.

Out of these regular viewers of rugby on television, Figure 4.13 shows that all (100%) of these spectators have witnessed the use of TMO (Television Match Official) in action on the television.
Figure 4.14 shows that these spectators feel that the TMO has a massive positive impact towards the match with a combined 94% of participants voting for a positive impact in some way. It also shows no participants feel this holds a negative impact on the game in any way.

Figure 4.14. Participants opinion on impact of TMO through television

There is a controversial divide as to whether the use of the TMO in rugby slows the game down or not. Figure 4.15 suggests that there is a split decision as to whether the use of the TMO slows the game down or not as 50% have voted yes and 50% have voted for no.
The majority of the respondents feel that watching the TMO decision through the television, helped them engage with the game better as 14 out of the 16 spectators who view rugby on the television thought this, as shown in Figure 4.16.

Figure 4.16. Number of spectators that feel the TMO through the television helped them engage with the game better

Figure 4.17 shows that out of the rugby spectators asked, 11 participants have viewed the use of TMO at the stadium live.

Figure 4.17. Number of participants who have viewed the TMO at the stadium
Corresponding with Figure 4.17, Figure 4.18 shows that 100% of these spectators feel that the TMO decision witnessed, impacted the game in a positive manner. With 55% of these votes, stating extremely positive.

Figure 4.18. Participants opinion of impact of TMO at the stadium

Figure 4.19 shows a very mixed decision as to whether the TMO witnessed in the stadium slowed the game down or not. Out of the 11 spectators who have witnessed a TMO decision, 6 believe it slowed the game down, whereas 5 participants believe it didn’t.
Figure 4.19. Number of participants who believe the TMO slows the game down in the stadium

Figure 4.20 suggests that viewing a TMO decision in a stadium, will help the spectator to engage with the game better as 8 out of the 11 participants asked believed that this was the case.

Figure 4.20. Number of spectators who feel that the TMO at the stadium helps to engage with the game better

4.1.3 Tennis

Figure 4.21 shows that out of the 16 tennis spectators which have partook in this questionnaire, 14 of these are regular viewers of tennis on television. Thus these will continue with this section of the questionnaire.

Are you a regular viewer of tennis on television?
Figure 4.21. Number of regular tennis viewers on television

Out of these 14 tennis viewing participants, all (100%) spectators have witnessed Hawkeye in action on the television due to its frequency in the game, as shown in Figure 4.22.

Figure 4.22. Number of tennis spectators who have witnessed Hawkeye on the television

Corresponding to Figure 4.22, Figure 4.23 shows that the majority (93%) of these spectators feel that Hawkeye affected the match in a positive manner. Whereas 7% felt that it was somewhat negative towards the match.
There is also a mixed argument that Hawkeye may have slowed the game down. 8 out of the 14 participants believe this technology slowed the game down, whereas 6 spectators believe it didn’t, as shown in Figure 4.24.

Figure 4.23. Participants opinion of impact of Hawkeye on the television

Figure 4.24. Number of tennis spectators that believe Hawkeye slowed the game down through the television
Figure 4.25 shows that viewing Hawkeye through the television, will help the spectator to engage with the match more, as 11 (79%) of spectators believe this decision review system helped them to engage with the match more.

![Bar chart showing the number of tennis spectators who believe Hawkeye on television helped them engage with the game better.](image)

**Figure 4.25. Number of tennis spectators that believe Hawkeye on the television helped them to engage with the game better**

9 out of the 16 tennis fans that partook in this questionnaire have witnessed Hawkeye in action at the arena in tennis, as shown in Figure 4.26. These participants will continue with this section of the questionnaire.

![Bar chart showing the number of tennis spectators who have witnessed Hawkeye live in person at the arena in tennis.](image)

**Figure 4.26. Number of tennis spectators that have witnessed Hawkeye at the arena in tennis**
Corresponding to Figure 4.26, Figure 4.27 shows that 100% of these spectators feel that this decision impacted the game in a positive manner, with 56% of these answers stating extremely positive.

![Pie chart showing opinions of impact of Hawkeye at the stadium](chart1)

**Figure 4.27. Participants opinion of impact of Hawkeye at the stadium**

It is felt that Hawkeye slows the game down when watching the match live at the stadium as 6 (67%) out of the 9 spectators questioned, feel that Hawkeye does in fact slow the game down, as shown in Figure 4.28.

![Bar chart showing whether respondents felt the game slowed down](chart2)
Figure 4.28. Number of participants that feel Hawkeye slowed the game down at the stadium

Even though this decision review system slows the game down, it also helps spectators engage with the game much better as 8 (89%) out of these 9 spectators believe Hawkeye helped them to interact with the game more, as shown in Figure 4.29.

Figure 4.29. Number of spectators that believe Hawkeye helped them to engage more at the stadium

4.1.4 Cricket

Out of the 13 cricket participants that partook in this questionnaire, 12 of these are regular viewers of cricket on television, as shown in Figure 4.30.

Figure 4.30. Number of regular viewers of cricket on television
Out of these 12 regular viewers of cricket on television, all (100%) of them have witnessed Hawkeye in action on the television, as shown in Figure 4.31. This is due to its frequency within the game.

**Figure 4.31. Number of viewers that have witnessed Hawkeye on the television for cricket**

Corresponding to Figure 4.31, Figure 4.32 shows that 100% of these spectators felt that this decision impacted the game in a positive manner, with the majority (83%) deciding that it was extremely positive towards the game.
Figure 4.32. Participants opinion of impact of Hawkeye on television for cricket

There is a split decision between whether the use of Hawkeye, whilst watching on television, slows the game down or not as 50% believe it does slow the game down and 50% believe it doesn’t, as shown in Figure 4.33.

Figure 4.33. Number of participants that believe Hawkeye slows the game down for cricket on television
Although this decision review system does slow the gameplay down, Figure 4.34 shows that 9 (75%) out of the 12 regular cricket viewers believe that the use of Hawkeye helps them to engage and interact with the game much better.

![Bar chart showing 9 out of 12 participants believed Hawkeye helped them engage with cricket more](image)

**Figure 4.34. Number of participants that believe Hawkeye on the television helped them to engage with cricket more**

Figure 4.35 shows that 11 out of the 12 cricket supporters which partook in this questionnaire have witnessed Hawkeye in action at the stadium.

![Bar chart showing 11 out of 12 spectators witnessed Hawkeye](image)

**Figure 4.35. Number of cricket spectators who have witnessed Hawkeye at the stadium**

Corresponding to Figure 4.35, Figure 4.36 shows that all (100%) of these spectators feel that this decision review system impacted the game in a positive manner with a considerable 91% believing that this technology was extremely positive towards the game.
There is also a mixed decision to whether the use of Hawkeye in cricket, slows the game down or not. 6 (55%) out of the 11 participants do believe that this technology did in fact slow the game down, as shown in Figure 4.37.

Figure 4.36. Participants opinion of impact of Hawkeye at the stadium in cricket

Figure 4.37. Number of participants who feel Hawkeye slows the game down in cricket at the stadium
Although this technology slows the game down, Figure 4.38 shows that the majority of supporters (82%) felt that this technology helped them to engage with the game better as 9 out of the 11 thought it helped them engage more.

**Figure 4.38. Number of cricket supporters that felt Hawkeye helps them engage with the game more at the stadium**

### 4.1.5 Sports

Overall, it is thought that decision review systems in sport are helping to improve refereeing decisions. Figure 4.39 shows that the vast majority of questionnaire participants believe this as 75 (96%) of the participants believe that this is the case.

**Figure 4.39. Number of participants who feel that decision review systems are improving refereeing decisions**
It is vastly believed that the overuse of decision review systems is not ruining certain sports as Figure 4.40 shows that 59 (76%) out of 78 participants believe decision review systems are not ruining certain sports, whereas 19 (24%) participants do believe this.

Figure 4.40. Number of participants who believe decision review systems are ruining certain sports

It is also vastly believed that the decision review systems are not taking out the real time excitement of sports due to the stoppages that need to take place as Figure 4.41 shows that 56 (72%) of participants actually disagree with this statement.
Figure 4.41. Number of participants that feel decision review systems are taking out the real time excitement of sports

It is quite clear that sports fans as a whole, would prefer sports to be officiated accurately with stoppages rather than freely. Figure 4.42 shows that 54 (69%) participants would prefer sports to be officiated 100% accurately with stoppages which disrupts the flow of the game.

![Graph to show whether spectators would rather the sport be officiated 100% accurately but with breaks in the flow of the game due to stoppages or would rather it flow freely and let the referees officiate the game by themselves](image)

Figure 4.42. Number of participants who would prefer sports to be officiated 100% accurately with stoppages

Sports fans would also prefer to watch sports live at the stadium/arena for the viewing aspect specifically, excluding other factors such as atmosphere. Figure 4.43 shows that 52 (67%) of participants would in fact prefer to watch sports live at the stadium/arena instead of on television. Whereas the remaining 26 (33%) would rather watch it on television.
4.2 Discussion

The questionnaire was completed by a total of 83 participants with 71% of these participants fitting in the age range of 18-26. Age isn’t a factor being studied in this particular research, but it has been questioned to explore if there is any correlation between the age of a participant and their feelings towards decision review systems or preference of watching. The results did not find any correlation with their feelings towards decision review systems, but they did find that the older generation would prefer to watch sports on the television as 60% of participants aged 46 or older opted for this option. Whereas 70% of 18-26 year olds would much prefer to watch sports live from inside the stadium/arena. Gutscher (2016) agrees with this statement and argues that it is due to stadiums technologically advancing by implementing strong in house Wi-Fi, as well as instant replays on the big screens to target this younger generation.

Figure 4.2 identifies the chosen sport of the participant. This then allows them to undertake the questionnaire relating to their chosen sport. Altogether, there were 32 football questionnaires filled out, 22 rugby questionnaires filled out, 16 tennis questionnaires filled out and finally, 13 cricket questionnaire responses.

4.2.1 Football

The general consensus of the effect of goal line technology towards a participants viewing experience is very positive. The questionnaire found that 88% of all participants believed goal line technology played a positive impact on the match whilst they were watching it on
television. 85% of these participants also believe that due to the speed of the technology, this did not slow the gameplay down, but it did in fact help the spectator engage with the game more.

This point was also supported in a semi-structured questionnaire;

“The goal line technology was 100% good as it’s so quick and effective but the video ref technology probably had a slightly negative effect on it, but equally for the managers and the team its positive because obviously the goals were rightly allowed and disallowed.”

The interviewee mentions a new emerging decision review system in football which is currently on trial. This is a video refereeing technology which allows the referee to stop play to review an incident such as a goal (FIFA, 2017). Didier Deschamps (2017), the Coach of the French national team has stated:

“If it is verified and it is fair, why not (use VAR). It changes our football a little…it is the evolution of football. That is how it will be.”

Although this technology is highly regarded by football professionals, it impacts the way in which a spectator would view the game. This technology will slow the gameplay down and have the potential to take out the real time excitement out of the game due to the stoppages needed to review the incident.

This point is supported in a semi-structured interview;

“I think the video ref technology may take away the excitement. If you bury a goal in the last minute, and you can’t celebrate with the fans, you’ve got to wait to go to the review system. Take the edge of it a bit, especially if it was a cup final.”

Another interviewee expressed;

“If this was introduced into football, the intensity would drop.”

The questionnaire has also found that goal line technology also has a positive impact towards spectators watching the match at the stadium, as 66% of participants agreed that the decision review system impacted the game in a positive manner of some sort. These spectators also feel that goal line technology does not slow the gameplay down and actually helps the spectator engage more which is similar to watching it on television. This questionnaire has also outlined that 17% of participants feel that viewing goal line technology in action at the stadium has had
a somewhat negative impact on the spectator compared to the 0% when watching it on the television. This may be due to the supporters not knowing whether the ball actually crossed the line or not when they are viewing the sport in the stadium, as they may be on the other side of the pitch and waiting for the referee to take action. Whereas on television, there is always a good angle provided and running commentary to keep the spectator up to date with the game.

4.2.2 Rugby

Decision review systems play a massive impact on a spectators viewing experience of rugby due to the frequency of the use of TMO within a game. 94% of all rugby supporters questioned, believed that watching the use of TMO through the television impacted the game in a positive manner with 44% of these viewers believing it was extremely positive, as shown in Figure 4.14. These viewers also feel that the use of this technology helps them engage with the game better with 88% of the viewers believing this. Unlike football, rugby fans have mixed feelings to whether the decision review system slows down the game or not whilst watching it on television. The questionnaire has found that 50% of spectators believe this and 50% do not.

A semi-structured interview stated when asked if they believe that TMO slows the game down when watching on television;

“To an extent, but I think the end justifies the means.”

Another interviewee stated;

“In rugby, a little bit as they slow the game down as they’re referring back to the TMO.”

Healey (2014) has argued against the interviewees stating;

“Because of the TMO, games can often last between 96 and 98 minutes – that is just too long. We saw it at Bath last week when it was almost two hours between kick off and the final whistle because of the toing and froing between the referee and the TMO… It is not making it a better spectacle and it is certainly not making the referees better. If we are not careful, supporters are going to turn away from the sport.”

Results from the questionnaire have also found that the use of TMO, whilst a spectator is at the stadium, has a very positive impact on the game with 100% of all participants believing it affects the game in a positive manner of some sort. 73% of these participants also feel that this technology helps them to engage with the game more. Similar to watching rugby on the
television, spectators at the stadium also have mixed beliefs that the TMO is slowing the game down with 55% of spectators feeling this way.

John Plumtree (2012), Sharks coach, has agreed with these findings from the questionnaire and has stated;

“I don't like it; it's slowing the game down too much and the TMO is having too much influence.”

It is also argued that the TMO plays a large impact on a spectators watching preference. A rugby spectator would rather watch the match live at the stadium.

This point is supported by a semi-structured interview;

“Watching it on the TV was positive and negative, obviously they got the decision right in the end but negative because it’s a lot slower on the TV.”

The interviewee goes on to state;

“I think it’s a lot more of an atmosphere when you’re there, whereas watching it from home, it’s like you’re wishing the game would hurry up. At the game you’re relishing the atmosphere.”

Another interviewee states;

“I would say if you were live at the stadium, it has a different impact on the spectator as it helps the spectator to engage more and feel part of the game.”

4.2.3 Tennis

Hawkeye is becoming an influential technology within the world of tennis. Results from the questionnaire show that when a spectator is watching tennis on the television, they believe Hawkeye is extremely effective as 93% of participants believe this technology has some sort of positive impact towards the game. Much like rugby, they believe that this decision review system helps them to engage with the game more with 79% of fans feeling this way. There is also mixed views on whether Hawkeye slows the game down or not as 57% of spectators through television believed that this was the case.

A semi-structured interview disagreed with the slowing down of the game, and stated;
“In tennis and cricket it only takes 10 seconds so it’s not really an issue.”

Results from the questionnaire of spectators viewing tennis in the stadium are similar to those that watch it on television. 100% of all participants feel that Hawkeye has some sort of positive impact towards the game with 56% of participants stating extremely positive. 89% of participants also feel that this technology helped them to engage with the game better. The results from the questionnaire also found that 67% of these participants feel that Hawkeye does slow the game down, whilst watching at the stadium.

Decision review systems do not impact a spectators viewing experience differently if they were watching tennis on the television, as opposed to in the stadium.

However, the qualitative data gathered did find a fault in the decision review system of Hawkeye. The interviewee stated;

“Apparently Hawkeye is 3mm out and the ball was 1mm out, so it could’ve been in or out.”

Another interviewee expressed their opinion on the same incident;

“The ball got called out and it went to the Hawkeye and it can only measure within 3mm I believe. The ball was actually in by 1mm so it could’ve actually been out. It brings a good atmosphere as it gets the crowd going when the Hawkeye is building up. I’d prefer to be there than watch it on TV.”

Ninan (2016) suggests that this fault picked up in the semi-structured interviews is in fact true. The International Tennis Federation are doing everything they can in an attempt to reduce this margin for error within the Hawkeye system.

4.2.4 Cricket

Cricket uses the same decision review system (Hawkeye) as tennis. The questionnaire also brought back very similar results due to this being the same decision review system. It found that from the viewers watching from the television, 100% of these believed that Hawkeye made a positive impact towards the match, with 83% of these participants feeling that it was extremely positive. The questionnaire has also found that 75% of these fans feel that the use of Hawkeye has helped them engage with the game much better. Similarly, to tennis, there is also mixed views on whether the use of Hawkeye slows the game down as 50% of these participants believe that it does in fact slow the game down. This is not actually a problem within the sport
of cricket. This is due to slow nature of cricket itself, along with the natural breaks that is possesses (Cave and Miller, 2016).

The questionnaire has also found that cricket fans viewing the sport at the stadium also feel that Hawkeye plays an extremely effective role in the game, as 100% of these participants feel it impacts the sport in a positive manner of some kind and 91% of these feel that it is extremely positive. Participants also feel that this technology helps the participant to engage with the sport more, as 82% of participants believe that this was the case. Similarly, to watching cricket on television, there is mixed views on whether Hawkeye actually slows the game down for the spectators at the stadium as 55% of the participants believe this. This again, shouldn’t be a problem for cricket as it is not a fast flowing game.

A semi-structured interview has supported this point by stating;

“Cricket it only takes 10 seconds so it’s not really an issue.”

4.2.5 Sports

As a general consensus, this questionnaire has found that decision review systems within sports are improving the refereeing decisions. 96% of all participants involved in this questionnaire believe that this is the case. 76% of these participants also believe that the overuse of these technologies are not ruining the sport or becoming a hindrance in any way.

This is supported by a semi-structured interview;

“No, I wouldn’t say a hindrance, I think if anything, the majority of teams would prefer it.”

He continues;

“I believe it makes the sport more honest and ethical.”

It is also believed that even though the general consensus of decision review systems does slow the game down, it doesn’t take away the real time excitement of the game as 72% of questionnaire participants believe this. This is due to the decision review system helping the spectators engage more with the game.

An interviewee talking about rugby supports this argument;

“It’s slowing the game down but it’s not taking any of the sport out of it, because if there’s foul play for example, they’ll bring it back to the foul play and they can referee it accordingly.”
Another interviewee argues about the slowing down of the game in football;

“I think the video ref in the match the other night slowed the game. There was around 10 minute’s added time, makes a big difference and I think it might be suited in cricket and rugby but not so much football.”

Sports spectators would prefer sports to be officiated 100% accurately with breaks in the flow of the game due to stoppages instead of free flowing game that lets the referees make their own decisions. The questionnaire has found that 69% of supporters would opt for the more accurate game.

This has been supported in a semi-structured interview;

“I would say it should be officiated 100% accurately with stoppages.”

Another interviewee has stated for;

“100% accurately but with breaks in the game.”

Whereas another interviewee has argued for the free flowing game;

“As a spectator, probably referee to the flow as its more fun to watch.”

Another interviewee has also argued for a free flowing game;

“I think I’d rather it flows because sometimes in sport, it’s the nature and things don’t go quite to plan.”

Healey (2014) also supports the argument that in sports, not everything goes the right way but that is the nature of sports itself. He also suggests that there is no such thing as the referee being wrong as he holds the power to make the final decision and should hold confidence in that decision without referring to a decision review system.

Spectators would also prefer to watch sports live at the stadium as opposed to watching it on television as 67% of participants have opted for this during the questionnaire. This is due to the decision review systems providing a better atmosphere within the stadiums as fans are able to witness these technologies in action together.

A semi-structured interview supports this argument;

“Probably live at the stadium due to the atmosphere.”
Another interviewee has stated;

“I would rather watch it live at the stadium as it’s a better atmosphere.”

Another interviewee has also stated;

“Live at the stadium... for the atmosphere and the banter.”

The qualitative and quantitative findings from the primary and secondary research has found that decision review systems are an extremely popular component of sport and is considered extremely effective by the majority of sports fans. These technologies have shown that they add another dimension of the game to sports itself from a spectators’ point of view which allows supporters to engage more with the sport and be more opinionated.
Chapter Five: Conclusion

5.0 Conclusion

This research project was to investigate the impact of decision review systems within sports on a spectators viewing experience. The aims of this study have been met by completing the objectives set at the start of this research. This study has effectively analysed the impact of decision review systems on sports spectators’ using quantitative and qualitative data sourced from primary and secondary research, as well as from relevant literature. A questionnaire has been effectively conducted to source primary research providing quantitative data on the subjective opinions of decision review systems within sports from these participants. In total, 83 responses from this questionnaire, were gathered to provide the researcher with data to then analyse. Semi-structured interviews have also been effectively conducted providing the researcher with qualitative primary data which has then supported the findings from the questionnaire. Secondary data and relevant literature has also been used to support these findings. In total, 5 semi-structured interviews were conducted. This research has analysed the impact towards spectators of four different sports, which are football, rugby, tennis and cricket. It has also compared the viewing experience of decision review systems whilst a spectator watches through the television as opposed to watching the sport live at the stadium.

This research has identified many key findings through the duration of this study. All the sports studied in this research project (football, rugby, tennis and cricket), affect the spectator in a positive manner with the use of decision review systems. The most effective use of this technology is in cricket as 100% of all spectators questioned, feel that this technology holds a positive impact towards the viewing of the game either on the television or live at the stadium. Even though there were mixed views on whether Hawkeye slows the gameplay of cricket down, this doesn’t actually affect the game that much anyway due to the nature of cricket’s slow play. This research has also identified a new and emerging technology of video assistant referees in football. This technology holds great potential to improve the accuracy of the game, but implementing it into football is a great risk, as football is a fast flowing game with little stoppages. This technology, if not implemented correctly, could lead to supporters being left uninterested with the game they are watching and the intensity of the game itself could potentially drop. This research recommends that this technology must be controlled and referees must not become dependent on this extra official. Another key finding that this research project has discovered is that Hawkeye has an extremely positive impact on spectators
watching tennis with 93% of participants stating it has a positive impact of some sort through television and 100% of participants believing that it impacts the game in a positive manner whilst live at the stadium. Primary and secondary research has also identified a fault in the Hawkeye system as there is a 3.6mm margin for error. Umpires, players and spectators rely on this technology to provide an accurate and reliable decision but due to the margin for error, this may not happen. To improve the accuracy and reliability of Hawkeye, this margin for error must be radically decreased to avoid instances such as the Nadal vs. Federer match which has been previously mentioned in this study. This research has identified that decision review systems are improving refereeing decisions as the majority (93%) of all participants that partook in the questionnaire believed this. They also found that even though the decision review systems may be slowing the game down in certain sports such as rugby, tennis and cricket, that these decision review systems are not actually taking the real time excitement out of the game, but are actually helping the spectators to engage with the sports more, as 72% of the participants believed that this was the case.

Overall, this research project has been extremely successful as it has met the aims and objectives which were set at the start. It has professionally conducted questionnaires and interviews to source primary data to be analysed for this project and adhered to all timeframes set. If this research were to take place again, more responses from the questionnaire would provide a wider knowledge of spectators’ views on these decision review systems within their own sport. More semi-structured interviews could also take place to again, provide a wider knowledge of spectators’ views on these technologies within their chosen sport.

### 5.1 Recommendations

As this study focuses on the impact of decision review systems within sports from the spectators’ point of view, further research can be focused on the impact of decision review systems on sports from the players’ point of view and also the referees’ point of view. This will provide further knowledge and understanding of the impact of these technologies within sports as a whole. Further research could also take place which examines the impact of decision review systems from the spectators’ point of view, in different sports than the four chosen in this study. These research ideas can then be compared to this research project, to identify any similarities or correlations between the spectators’ opinions of these four sports, to those of different sports and to the opinions of players and referees.
Chapter Six: References and Bibliography


Chapter Seven: Appendices

Appendix A: Questionnaire Questions

Please answer all questions from a spectators’ point of view.

1. What is your age?
   - 18-26
   - 27-35
   - 36-45
   - 46 or over

2. Which sport are you most interested in?
   - Football
   - Rugby
   - Tennis
   - Cricket

3. Are you a regular viewer of this sport selected on the television?
   - Yes
   - No

4. Have you ever witnessed a decision review system for this sport on the television?
   - Yes
   - No

5. Did it make a positive or negative impact towards the game?
   - Extremely Positive
   - Somewhat Positive
   - Neither Positive nor Negative
   - Somewhat Negative
   - Extremely Negative

6. Did you feel it slowed the game down?
   - Yes
   - No

7. Did you feel it helped you as the spectator, to engage with the game better?
   - Yes
   - No

8. Have you ever witnessed a decision review system live in person at the stadium/arena from your selected sport?
   - Yes
   - No

9. Did it make a positive or negative impact towards the game?
   - Extremely Positive
• Somewhat Positive
• Neither Positive nor Negative
• Somewhat Negative
• Extremely Negative

10. Did you feel it slowed the game down?
   • Yes
   • No

11. Did you feel it helped you as the spectator, to engage with the game better?
   • Yes
   • No

12. Do you believe the increase of decision review systems are improving refereeing decisions?
   • Yes
   • No

13. Do you believe that the overuse of decision review systems are ruining certain sports?
    • Yes
    • No

14. Do you agree with the argument that decision review systems are taking out the real time excitement of sports due to the stoppages which need to take place?
    • Yes
    • No

15. As a spectator, would you rather the sport be officiated 100% accurately but with breaks in the flow of the game due to stoppages or would you rather it flow and let the referee officiate the game by themselves?
    • 100% Accurately with stoppages
    • The referee with a free flowing game

16. Would you rather watch sports live on television or live at the stadium/arena for the viewing aspect of the sport?
    • On Television
    • At the Stadium/Arena
Appendix B: Semi-Structured Interviews

Interviewee Participant Number: 1

Interviewer: What sports are you interested in? And what is your most chosen sport?
Interviewee: Mainly interested in football, but I do also like rugby and some other various sports but football is the main one
Interviewer: do you have much level of knowledge within football?
Interviewee: I do believe so, yes.
Interviewer: have you ever been to any live matches of this sport?
Interviewee: yes I have attended live matches of football, in particular, Cardiff City FC
Interviewer: are you a regular viewer of these sports on television?
Interviewee: yes, very keen
Interviewer: have you witnessed any decision review systems at a stadium?
Interviewee: yes in rugby but not in football
Interviewer: have you witnessed any on the television?
Interviewee: yes loads
Interviewer: have you noticed the increased introduction of decision review systems within your chosen sport of football?
Interviewee: yes quite heavily and quite recently. In very recent weeks, they’ve started to bring it in to actual live gameplay, for instance offsides and tackles
Interviewer: do you believe that these decision review systems are bringing a positive impact on the sport?
Interviewee: I believe it makes the sport more honest and ethical, so probably yes
Interviewer: do you believe that these decision review systems are becoming a hindrance within your sport?
Interviewee: no I wouldn’t say a hindrance, I think if anything, the majority of teams would prefer it
Interviewer: do you agree that these decision review systems are slowing the gameplay down and taking out an element of sports itself?
Interviewee: I wouldn’t say it is in football, but I think there is an element of slowing the game down in rugby, tennis and cricket. If this was introduced into football, the intensity would drop
Interviewer: when have you witnessed a decision review system in person?
Interviewee: a try decision watching rugby in a stadium
Interviewer: did the decision review system impact the game in a positive or negative way?
Interviewee: positive because everyone thought it was a try but it actually wasn’t a try and it was in the last couple of minutes of the game, so it would’ve influenced the final score
Interviewer: have you witnessed a decision review system on the television?
Interviewee: yes I have
Interviewer: did the decision review system impact the game in a positive or negative way?
Interviewee: it gave the goal in football when it was over the line, when the majority of people thought that it hadn’t crossed the line
Interviewer: do you believe that decision review systems have a different impact on a spectator if they were at the event live, as opposed to watching it on television?
Interviewee: yes, I feel like you would be more involved with the game if you were there where as if you were to watch it on TV you may have a different perspective. It helps the spectator engage with the game more
Interviewer: as a spectator, would you rather the sport to be officiated 100% accurately but with breaks in the flow of the game due to stoppages or would you rather it flow and let the referee officiate the game by themselves?
Interviewee: 100% accurately but with breaks in the game
Interviewer: would you rather watch sports live on television or at the event/stadium?
Interviewee: good question, probably live at the stadium due to the atmosphere

**Interviewee Participant Number: 2**

Interviewer: do you have an interest within sports and if so what is your chosen sport?
Interviewee: yes I’ve got loads of interest within sport, my main sport being rugby
Interviewer: do you have much level of knowledge within this sport?
Interviewee: I’ve got a large level of knowledge within this sport
Interviewer: have you been to any live matches of rugby before?
Interviewee: yes I have
Interviewee: are you a regular viewer of rugby on television?
Interviewer: yes I am
Interviewer: have you ever witnessed a decision review system in action in rugby?
Interviewee: yes I have
Interviewer: have you noticed an increase of tmo within rugby?
Interviewee: yes I have
Interviewer: do you believe that these decision review systems are bringing a positive impact on the sport?
Interviewee: yes I do
Interviewer: do you believe that these decision review systems are becoming a hindrance on the sport?
Interviewee: no I don’t
Interviewer: do you believe that these decision review systems are slowing the gameplay down and taking out an element of sport itself due to stoppages?
Interviewee: to an extent, but I think the end justifies the means
Interviewer: have you witnessed a decision review system in person? If so, when?
Interviewee: I have when I went to watch Wales vs Fiji
Interviewer: did the decision review system impact the game in a positive or negative way?
Interviewee: in a positive way
Interviewer: have you witnessed a decision review system on the television?
Interviewee: yes I have
Interviewer: did you feel that resulted in a positive or negative way?
Interviewee: in a positive way
Interviewer: do you believe that these decision review systems have a different impact on a spectator if they were live at the event as opposed to watching it on television?
Interviewee: I would say if you were live at the stadium, it has a different impact on the spectator as it helps the spectator to engage more and feel part of the game
Interviewer: as a spectator would you rather the sport be officiated 100% accurately but with breaks in the flow of the game due to stoppages or would you rather it flows and let the referee officiate the game by themselves?
Interviewee: good question, I would say it should be officiated 100% accurately with stoppages
Interviewer: would you rather watch sports live on television or live at the stadium?
Interviewee: I’m going to say live at the stadium

**Interviewee Participant Number: 3**

Interviewer: do you have an interest within sports? If so, which sport?
Interviewee: I have a keen interest in a lot of sports, but main one is obviously football
Interviewer: do you have a high level of knowledge within this sport?
Interviewee: I’d say I’ve got a high level of knowledge within this sport at various different levels
Interviewer: have you been to many live matches before?
Interviewee: I regularly go to live matches yes, almost every week
Interviewer: I take it you’re a regular viewer of football on television as well?
Interviewee: also on television, yes, again every week probably
Interviewer: have you witnessed any decision review systems within this sport?
Interviewee: I have, I watched the France vs Spain the other day, where they trialled the video ref technology and they ruled out Griezmann’s goal and allowed Dellofeou’s goal after it was flagged offside
Interviewer: have you noticed an increase in the introduction of decision review systems within football?
Interviewee: yeah definitely because of that game as they’re trialling it and goal line technology in the premier league
Interviewer: do you believe that these decision review systems are bringing a positive impact on the sport?

Interviewee: I think the goal line technology is definitely, but I think the video ref technology may take away the excitement. If you bury a goal in the last minute, and you can’t celebrate with the fans, you’ve got to wait to go to the review system. Take the edge of it a bit, especially if it was a cup final

Interviewer: do you believe that these decision review systems are becoming a hindrance in the sport at all?

Interviewee: no not yet because some of its still on trial. Goal line’s beneficial but the video ref depends on the trial

Interviewer: do you believe that these decision review systems are slowing the gameplay down and taking out an element of sport itself?

Interviewee: I think the video ref in the match the other night slowed the game. There was around 10 minutes added time, makes a big difference and I think it might be suited in cricket and rugby but not so much football

Interviewer: have you witnessed a decision review system in person at the stadium?

Interviewee: I don’t think I have in person, as I watch lower league football and it’s not there yet

Interviewer: have you witnessed a decision review system on the television?

Interviewee: yes I have

Interviewer: did it impact the game in a positive or negative way?

Interviewee: the goal line technology was 100% good as it’s so quick and effective but the video ref technology probably had a slightly negative effect on it, but equally for the managers and the team its positive because obviously the goals were rightly allowed and disallowed

Interviewer: do you believe that these decision review systems have a different impact on a spectator if they are at the event/stadium as opposed to watching on the television?

Interviewee: I’d say definitely yes, you can’t celebrate and go mad when you score, so its definitely not the same

Interviewer: as a spectator, the sport be officiated 100% accurately but with breaks in the flow of the game due to stoppages, or would you rather it flow and let the referee officiate the game by themselves?

Interviewee: I think I would compromise, definitely have the goal line technology because you want that but you can’t be video refereeing every throw in or corner. Its hard to draw the line

Interviewer: would you rather watch sports live on television or live at the stadium?

Interviewee: live at the stadium, I obviously still enjoy it on TV but I’d say the stadium

Interviewee Participant Number: 4

Interviewer: do have many interest within sport? If so, what is your chosen sport?
Interviewee: sports has massive influence on my life, in particular rugby
Interviewer: do you have a high level of knowledge within this sport?
Interviewee: I believe so, I’ve been involved with it for 10 years
Interviewer: have you ever been to any live matches before to watch?
Interviewee: I certainly have, from grass roots level to end level
Interviewer: are you a regular viewer of this sport on television?
Interviewee: indeed, my favourite pass time is to watch a good game on TV
Interviewer: have you ever witnessed any decision review systems at a game or on TV?
Interviewee: yes I have, in rugby you get the TMO decision, it sort of slows the game down a little bit but its good
Interviewer: have you noticed an increase in the introduction of decision review systems in rugby?
Interviewee: yes, they see the TMO, he’s getting more and more involved, especially with back play, he’ll pick something up which was unseen by the referee and the touch judges and he’ll bring it back to that incident
Interviewer: do you believe that these decision review systems are bringing a positive or negative impact on the sport?
Interviewee: yes because its right if it’s done correctly
Interviewer: do you believe that these decision review systems are becoming a hindrance in any way?
Interviewee: in rugby, a little bit as they slow the game down as they’re referring back to the TMO
Interviewer: do you agree that these decision review systems are slowing the gameplay down and taking out an element of sport itself?
Interviewee: it’s slowing the game down but it’s not taking any of the sport out of it, because if there’s foul play for example, they’ll bring it back to the foul play and they can referee it accordingly
Interviewer: when have you witnessed a decision review system in person at a game/stadium?
Interviewee: principality stadium and there was an issue with an Irishman, they had to go to the TMO and they brought it on the big TV in the middle so everyone can see what the TMO’s seeing. It’s pretty good as you can see what the TMO is seeing and what has actually happened, it brings up the atmosphere, brings up the foul play. It was a cheap shot with a fist and the welsh side were obviously raving and all the Irish fans went a bit quiet
Interviewer: did you feel the decision gave a positive or negative impact on that game?
Interviewee: positive because a lot of people saw it, in the supporters and it was brought back to the foul play and refereed very well and helped spectators to engage with the game bringing a better atmosphere
Interviewer: have you witnessed a decision review system on television?
Interviewee: yes I have
Interviewer: did you feel this gave a positive or negative impact on the game?
Interviewee: watching it on the TV was positive and negative, obviously they got the decision right in the end but negative because it’s a lot slower on the TV.

Interviewer: do you feel that these decision review systems have a different impact on a spectator if they were at the event live as opposed to watching it on the television?

Interviewee: yes certainly, I think it’s a lot more of an atmosphere when you’re there, whereas watching it from home, its like you’re wishing the game would hurry up. At the game you’re relishing the atmosphere.

Interviewer: so as a spectator, would you rather the sport be officiated 100% accurately but with breaks in the flow of the game due to stoppages, or would you rather a flowing game and let the referee officiate by himself?

Interviewee: as a spectator, probably referee to the flow as its more fun to watch.

Interviewer: would you rather watch sports live at the stadium or on television?

Interviewee: I would rather watch it live at the stadium as it’s a better atmosphere. There’s a good example of hawkeye in tennis with Nadal vs Federer. The ball got called out and it went to the hawkeye and it can only measure within 3mm I believe. The ball was actually in by 1mm so it could’ve actually been out. It brings a good atmosphere as it gets the crowd going when the Hawkeye is building up. I’d prefer to be there than watch it on TV.

**Interviewee Participant Number: 5**

Interviewer: Do you have a lot of interest within sport and if so, what is your chosen sport?

Interviewee: I really like tennis and cricket.

Interviewer: what is your level of knowledge within these sports?

Interviewee: I’d say I’ve got an advanced knowledge of these sports, in particular in tennis.

Interviewer: have you ever been to any live matches of these sports before?

Interviewee: yeah I’ve been to Wimbledon and to cricket games.

Interviewer: are you a regular viewer of these sports on television?

Interviewee: yeah I love watching these sports on television, especially all the grand slams and the ashes.

Interviewer: have you ever witnessed any decision review systems in person at an event such as tennis or cricket?

Interviewee: yes I have.

Interviewer: have you noticed the increase in the introduction of decision review systems within your sports?

Interviewee: yeah it happens a lot more often in the past couple of years.

Interviewer: do you believe that these decision review systems are bringing a positive impact on your sports?

Interviewee: yeah I think they lead to a fairer game.

Interviewer: do you believe that these decision review systems are becoming a hindrance in any way?
Interviewee: no because in tennis and cricket it only takes 10 seconds so it’s not really an issue

Interviewer: do you believe that these decision review systems are slowing the game down and taking out an element of sport itself?

Interviewee: no I don’t agree with that

Interviewer: not even in cricket?

Interviewee: no I don’t believe so as it doesn’t take that long

Interviewer: you’ve already mentioned that you’ve witnessed a decision review system in person, did it make a positive or negative impact on the game?

Interviewee: positive because the umpire called it out when it was actually in

Interviewer: so it created a fairer game?

Interviewee: yeah

Interviewer: have you witnessed a decision review system on the television within tennis or cricket?

Interviewee: yes I remember a match between Nadal and Federer

Interviewer: did it impact the game in a positive or negative way?

Interviewee: negative

Interviewer: could you expand on what happened?

Interviewee: apparently hawkeye is 3mm out and the ball was 1mm out, so it could’ve been in or out

Interviewer: are there any instances within cricket that you’ve witnessed?

Interviewee: not off the top of my head no apart from the ashes

Interviewer: do you believe that these decision review systems have a different impact on the spectator if they were at the event live as opposed to watching it on television

Interviewee: not in tennis I don’t think, but if it was in football, and they were celebrating a goal and then it’s not a goal, it could be quite disappointing

Interviewer: as a spectator, would you rather the sport be officiated 100% accurately but with breaks in the flow of the game due to stoppages or would you rather it flow and let the referee officiate the game by themselves?

Interviewee: I think I’d rather it flow because sometimes in sport, it’s the nature and things don’t go quite to plan

Interviewer: finally, would you rather watch sports live on television or live at the stadium or arena?

Interviewee: live at the stadium

Interviewer: what’s the reasoning for this?

Interviewee: for the atmosphere and the banter
Appendix C: Ethics Form

When undertaking a research or enterprise project, Cardiff Met staff and students are obliged to complete this form in order that the ethics implications of that project may be considered. If the project requires ethics approval from an external agency (e.g., NHS), you will not need to seek additional ethics approval from Cardiff Met. You should however complete Part One of this form and attach a copy of your ethics letter(s) of approval in order that your School has a record of the project. The document Ethics application guidance notes will help you complete this form. It is available from the Cardiff Met website. The School or Unit in which you are based may also have produced some guidance documents, please consult your supervisor or School Ethics Coordinator.

Once you have completed the form, sign the declaration and forward to the appropriate person(s) in your School or Unit.

PLEASE NOTE:
Participant recruitment or data collection MUST NOT commence until ethics approval has been obtained.

PART ONE

<table>
<thead>
<tr>
<th>Name of applicant:</th>
<th>Mitchell Hunt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor (if student project):</td>
<td>Dr Jason Williams</td>
</tr>
<tr>
<td>School / Unit:</td>
<td>School of Management</td>
</tr>
<tr>
<td>Student number (if applicable):</td>
<td>St20044047</td>
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<tr>
<td>Programme enrolled on (if applicable):</td>
<td>Business Information Systems</td>
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<tr>
<td>Project Title:</td>
<td>Decision Review Systems Within Sports: An Investigation of Decision Review Systems within Sports and the Impact these Technologies have on Spectators</td>
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<tr>
<td>Expected start date of data collection:</td>
<td>01/02/2017</td>
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<tr>
<td>Approximate duration of data collection:</td>
<td>6 Weeks</td>
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<tr>
<td>Funding Body (if applicable):</td>
<td>N/A</td>
</tr>
<tr>
<td>Other researcher(s) working on the project:</td>
<td>N/A</td>
</tr>
<tr>
<td>Will the study involve NHS patients or staff?</td>
<td>No</td>
</tr>
<tr>
<td>Will the study involve human samples and/or human cell lines?</td>
<td>No</td>
</tr>
</tbody>
</table>

Does your project fall entirely within one of the following categories:

- Paper based, involving only documents in the public domain | No |
- Laboratory based, not involving human participants or human samples | No |
Practice based not involving human participants (eg curatorial, practice audit) | No
---|---
Compulsory projects in professional practice (eg Initial Teacher Education) | No
A project for which external approval has been obtained (e.g., NHS) | No

If you have answered YES to any of these questions, expand on your answer in the non-technical summary. No further information regarding your project is required.

If you have answered NO to all of these questions, you must complete Part 2 of this form

In no more than 150 words, give a non-technical summary of the project

The topic which I have chosen to study is the impact of decision review systems within sports to the spectators’ point of view. The study aims to analyse and discuss the effects of the spectator viewing experience in the stadium/arena and through the television. This is to find out whether the new technology that has been introduced within sport is actually an asset or whether it’s just a hindrance. Primary and secondary data will be used throughout the project. Secondary data will be gathered through the use of articles, journals, textbooks etc. Primary data will be gathered through the use of interviews and online questionnaires.

DECLARATION:
I confirm that this project conforms with the Cardiff Met Research Governance Framework

I confirm that I will abide by the Cardiff Met requirements regarding confidentiality and anonymity when conducting this project.

STUDENTS: I confirm that I will not disclose any information about this project without the prior approval of my supervisor.

Signature of the applicant: Mitchell Hunt
Date: 10th December 2016

FOR STUDENT PROJECTS ONLY
Name of supervisor: Dr. Jason Williams
Date: 10th December 2016
Signature of supervisor: Jason Williams

Research Ethics Committee use only
Decision reached:
- Project approved
- Project approved in principle
- Decision deferred
- Project not approved
- Project rejected

Project reference number: Click here to enter text.
Name: Click here to enter text.
Date: Click here to enter a date.
Signature:
PART TWO

A RESEARCH DESIGN

<table>
<thead>
<tr>
<th>Q</th>
<th>A1 Will you be using an approved protocol in your project?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>A2 If yes, please state the name and code of the approved protocol to be used</td>
<td>N/A</td>
</tr>
<tr>
<td>Q</td>
<td>A3 Describe the research design to be used in your project</td>
<td>This study will use both qualitative and quantitative data to analyse the impact of decision review systems within sports on spectators. Online Questionnaires and interviews will be conducted to gather primary data. Online Questionnaires In this research method, I am aiming to collect 80+ respondents from the online questionnaire to ensure the validity of the study and gain a large amount of data. The questionnaire will be quantitative and will be posted to multiple sports forums and also the researchers social media (Facebook and Twitter). The participant will be told details of the study and its goals plus the participant must consent before completing the questionnaire. The questionnaire will take approximately 5 minutes to complete. I have chosen Survey Monkey to host the online questionnaire as I have had previous experience with this website. Face-to-Face Interviews I will be using semi structured interviews for this research method. Open ended questions to collect qualitative data. The freedom of response from the interviewees will allow opinions and thoughts of the participants to be received. Contact with the interviewees will take place in December with the interviews forecasted to take place in January. There is an aim for 5 interviews to take place and the interviews will take approximately 15 minutes. All data will remain confidential and will be stored securely in a password protected computer system.</td>
</tr>
<tr>
<td>Q</td>
<td>A4 Will the project involve deceptive or covert research?</td>
<td>No</td>
</tr>
<tr>
<td>Q</td>
<td>A5 If yes, give a rationale for the use of deceptive or covert research</td>
<td>N/A</td>
</tr>
<tr>
<td>Q</td>
<td>A6 Will the project have security sensitive implications?</td>
<td>No</td>
</tr>
<tr>
<td>Q</td>
<td>A7 If yes, please explain what they are and the measures that are proposed to address them</td>
<td>N/A</td>
</tr>
</tbody>
</table>

B PREVIOUS EXPERIENCE

---

1 An Approved Protocol is one which has been approved by Cardiff Met to be used under supervision of designated members of staff; a list of approved protocols can be found on the Cardiff Met website here
B1 What previous experience of research involving human participants relevant to this project do you have?

I have experience of research involving human participants during my final year of sixth form when completing an A-Level geography project. In addition, University modules such as developing a business has given me previous experience of creating online questionnaires, consent forms and participant information sheets.

B2 Student project only

What previous experience of research involving human participants relevant to this project does your supervisor have?

Click here to enter text.

C POTENTIAL RISKS

C1 What potential risks do you foresee?

<table>
<thead>
<tr>
<th>Online Questionnaires</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• I will not receive the required amount of completed questionnaires</td>
<td></td>
</tr>
<tr>
<td>• Risks of not meeting the research deadlines</td>
<td></td>
</tr>
<tr>
<td>• Risk of confidentiality problems</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviews</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• The interviewee may get offended by the questions</td>
<td></td>
</tr>
<tr>
<td>• Causing inconvenience to the interviewee during their day</td>
<td></td>
</tr>
</tbody>
</table>

C2 How will you deal with the potential risks?

<table>
<thead>
<tr>
<th>Online Questionnaires</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Every effort will be made to push for as many completed questionnaires possible through posting on multiple forums and through posting on social media.</td>
<td></td>
</tr>
<tr>
<td>• Every effort will be made to stick to the set research deadlines to not fall behind at any point throughout this study.</td>
<td></td>
</tr>
<tr>
<td>• Questionnaires will have no trace back to the participant keeping it anonymous.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviews</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• The participant will have the right to withdraw their data at any point without penalty.</td>
<td></td>
</tr>
<tr>
<td>• These will be arranged in advance at a location and on a date confirmed by the researcher and participant. The researcher will take their mobile phone with them to the interview.</td>
<td></td>
</tr>
<tr>
<td>• Participation Information sheet and Consent form will be sent to the interviewee to ensure they are aware of the topics up for discussion.</td>
<td></td>
</tr>
</tbody>
</table>

When submitting your application you MUST attach a copy of the following:

- All information sheets
- Consent/assent form(s)

An exemplar information sheet and participant consent form are available from the Research section of the Cardiff Met website.
Appendix D: Participant Consent Form

Cardiff Metropolitan University
Ethics Committee

PARTICIPANT CONSENT FORM

Cardiff Metropolitan University Ethics Reference Number:
Participant name or Study ID Number:
Title of Project: The positive and negative impacts on using decision review systems within sports
Name of Researcher: Mitchell Hunt

Participant to complete this section: Please initial each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. [ ]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [ ]

3. I agree to take part in the above study. [ ]

4. I agree to the interview / focus group / consultation being recorded [ ]

5. I agree to the use of anonymised quotes in publications
   Yes [ ] No [ ]

6. I would like my organisations’ name to be anonymised in all publications [ ]

_______________________________________  ___________________
Signature of Participant                     Date

_______________________________________  ___________________
Name of person taking consent             Date

____________________________________
Signature of person taking consent
Appendix E: Participant Information Sheet

PARTICIPANT INFORMATION SHEET

The Positive and Negative Impacts on Using Decision Review Systems Within Sports

Project summary
The purpose of this research project is to analyse the impact of decision review systems within sports and to discuss the effects of the spectator viewing experience in the stadium/arena and through the television. Your participation will enable the collection of data which will form part of a study being undertaken at Cardiff Metropolitan University.

Why have you been asked to participate?
You have been asked to participate because you fit the profile of the population being studied; that is you are an avid fan and watcher of multiple sports. During the interview, you will be asked a range of questions relating to decision review systems within sports. Your participation is entirely voluntary and you may withdraw at any time.

Project risks
The research involves the completion of an interview which will be recorded for later analysis. We are not seeking to collect any sensitive data on you; this study is only concerned with decision review systems within sports and its effect of the spectators. We do not think that there are any significant risks associated with this study. However, if you do feel that any of the questions are inappropriate then you can stop at any time. Furthermore, you can change your mind and withdraw from the study at any time – we will completely respect your decision.

How we protect your privacy
All the information you provide will be held in confidence. We have taken careful steps to make sure that you cannot be directly identified from the information given by you. Your personal details (e.g. signature on the consent form) will be kept in a secure location by the research team. When we have finished the study and analysed all the information, the documentation used to gather the raw data will be destroyed except your signed consent form which will be held securely for 5 years. The recordings of the interview will also be held in a secure and confidential environment during the study and destroyed after 5 years.

YOU WILL BE OFFERED A COPY OF THIS INFORMATION SHEET TO KEEP

If you require any further information about this project then please contact:
Mitchell Hunt, Cardiff Metropolitan University
Cardiff Metropolitan University email: st20044047@cardiffmet.ac.uk
Supervisor email: jjwilliams@cardiffmet.ac.uk
**Appendix F: Semi-Structured Interview Guide**

<table>
<thead>
<tr>
<th>Order of semi structured Interview</th>
<th>Discussed</th>
</tr>
</thead>
</table>
| 1) Ask respondent approval to use recording systems  
Ask respondent to sign and acknowledge consent form | |
| 2) Ask Background questions  
Confirm information about;  
  - name of the interviewee  
  - Interests within sports – which sports?  
  - Level of knowledge within sports | |
| 3) Discuss about Experience  
Probes  
  - Have you been to many live matches before?  
  - Are you a regular viewer of these sports on the television?  
  - Have you witnessed any decision review system in person at a game/match? | |
| 4) Discuss the introduction of decision review systems within sports  
Probes  
  - Have you noticed the increase of introduction to decision review systems within your chosen sport?  
  - Do you believe that these decision review systems are bringing a positive impact on the sport?  
  - Do you believe that these decision review systems are becoming a hindrance within your sport?  
  - Do you agree that these decision review systems are slowing the gameplay down and taking out an element of sport itself? | |
| 5) Discuss the decision review system from a spectators’ point of view  
Probes  
  - When have you witnessed a decision review system in person?  
  - Did the decision review system impact the game in a positive or negative way?  
  - Have you witnessed a decision review system on the television?  
  - Did the decision review system impact the game in a positive or negative way?  
  - Do you believe that these decision review systems have a different impact on a spectator if they were at the event live as opposed to watching it on television?  
  - Do you believe that these decision review systems have a different impact on a spectator if they were at the event live as opposed to watching it on television?  
  - As a spectator, would you rather the sport be officiated 100% accurately but with breaks in the flow of the game due to stoppages or would you rather it flow and let the referee officiate the game by themselves? | |
Appendix G: Questionnaire Layout

What is your age?
- 18-26
- 27-35
- 36-45
- 46 or older

Which sport are you most interested in?
- Football
- Rugby
- Tennis
- Cricket

Are you a regular viewer of the sport selected in Q3 on television?
- Yes
- No

Have you ever witnessed a decision review system (hawkeye, TMO or goal line technology) in action on the television?
- Yes
- No

Did it make a positive or negative impact towards the game/match?
- Extremely positive
- Somewhat positive
- Neither positive nor negative
- Somewhat negative
- Extremely negative

Did you feel it slowed the game down?
- Yes
- No
Did you feel it helped you as the spectator, to engage with the game better?

- Yes
- No

Have you ever witnessed a decision review system (hawkeye, TMO or goal line technology) live in person at the stadium/arena from the selected sport in Q3?

- Yes
- No

Did it make a positive or negative impact on the game/match?

- Extremely positive
- Somewhat positive
- Neither positive nor negative
- Somewhat negative
- Extremely negative

Did you feel it slowed the game down?

- Yes
- No

Did you feel it helped you as the spectator, to engage with the game better?

- Yes
- No
Do you believe the increase of decision review systems are improving refereeing decisions?

☐ Yes
☐ No, Please Specify Why

Do you believe that the overuse of decision review systems are ruining certain sports?

☐ Yes, Please state which sports and why
☐ No

Do you agree with the argument that decision review systems are taking out the real time excitement of sports due to the stoppages which need to take place?

☐ Yes
☐ No

As a spectator, would you rather the sport be officiated 100% accurately but with breaks in the flow of the game due to stoppages or would you rather it flow freely and let the referee officiate the game by themselves?

☐ 100% accurately with stoppages
☐ Referee with a free flowing game

Would you rather watch sports live on television or live at the stadium/arena for the viewing aspect of the sport?

☐ On Television
☐ At the Stadium/Arena