

Elite Rugby Union Players Perceptions Towards
Performance Analysis

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Dissertation submitted as part requirement for the
Masters of Science in Sports Coaching
at University of Worcester.

September 2013

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Abstract

The utilisation of performance analysis, within rugby union, has been documented for over twenty years. Current research has explored the trends and traits which currently exist between teams, individuals and certain playing positions. However, no existing research has been published regarding the thoughts and opinions of the individuals who are the start and end of the performance analysis process. Therefore, this study provides an in depth insight into the current views and opinions of elite level rugby union players regarding the use of performance analysis as a tool for improving their own playing performance and in highlighting the strengths and weaknesses of upcoming opponents.

A total of seventy three elite level rugby union players from two clubs in Great Britain completed a semi-structured questionnaire. After completing the questionnaire, four players were to undertake a semi-structured interview. Four key themes emerged, following inductive content analysis: (1) the use of video for player development, (2) preparing for a match, (3) using video for player reflection in addition to other psychological tools and (4) players suggestions for improvements to the clubs current performance analysis programme. Therefore concluding that players view performance analysis as a beneficial and useful tool to support their development and preparation.

The findings of the study provide an insight into the use of performance analysis within professional rugby union, enabling rugby coaches and practitioners to gain

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an understanding of how players view the clubs current programme. Additionally, the findings help build and strengthen the on-going knowledge coaches, analysts and researchers current have regarding how players perceive performance analysis. However, additional research is required to gain a comprehensive understanding of rugby union player's views and thoughts towards the sport and exercise discipline of performance analysis.

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Abbreviations

AASE	Advanced Apprenticeship in Sporting Excellence
GPS	Global Positioning Satellite System
IRB	International Rugby Board
M	Mean
N	Number
PA	Performance Analysis
Q	Questionnaire
RU	Rugby Union
SD	Standard Deviation

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Preface and Acknowledgments

As part of this dissertation I would like to thank a few individuals for their support during the completion of this project. Firstly, the rugby union clubs, the coaches, the performance analysts and the players for their involvement and support within the study. Secondly, Mr Gareth Jones for the supervision and guidance he has provided throughout the completion of the project. Finally, I would also like to thank my family for their continuing support and advice throughout the completion of this master's dissertation.

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The Perceptions of Rugby Union Players Towards Performance

Analysis

1.0. Introduction

During the past decade, the utilisation of performance analysis (PA) by elite and sub-elite athletes and coaches has increased significantly (Mellalieu et al. 2008; O'Donoghue 2010; Bampouras et al. 2012). Literature has concentrated upon collecting accurate, objective and reliable performance data to underpin future interventions (Hughes & Bartlett 2008). Within rugby union (RU), a variety of PA topics have been examined by academics, including movement characteristics (Cahill et al. 2013), patterns of play (Sasaki et al. 2007), officials (Kraak et al. 2011), successful determinants of performance (van Rooyen 2012; Vaz et al. 2012), player profiles (Francis & Jones 2012) and prediction models (Lim et al. 2011).

However, minimal focus has been paid to the views and opinions held by athletes towards this new technology (Groom et al. 2011; Bampouras et al. 2012; Groom et al. 2012; Nelson et al. 2011). As Bampouras and others (2012: p.479) state, "the athlete is both the object and receiver of the performance analysis process, but has little access to the process beyond this", and therefore this area seems of great importance for future research.

The existing research within this field has identified the complexities of utilising this technology within individual and team sports (Nelson et al. 2011;

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Bampouras et al. 2012). For example, the importance of building and maintaining a coach-athlete relationship, therefore ensuring each player's learning preferences are understood, thus guaranteeing the maximum amount of PA feedback is remembered by each player and the team. Additionally, the effectiveness of involving players within the PA process has been suggested as this places an increased ownership on their performance, but only if managed appropriately (Bampouras et al. 2012).

Although these primary studies (e.g. Groom et al. 2011; Nelson et al. 2011; Bampouras et al. 2012) have provided a foundational insight into the views and opinions towards PA, the data from these studies utilised interview data. The small sample sizes for the studies have made it difficult to gain a complete picture of the views and opinions by athletes towards PA. However, Groom & Cushion's (2005) utilised semi-structured questionnaires to collect data from a larger sample size, and thus were able to provide an insight into one specific team's views. Therefore, by combining these two research methods, the collection of additional research will provide a greater insight into the fundamental knowledge towards athlete's views and opinions towards PA.

The majority of the studies completed to date have examined the perceptions of football players towards PA and identified a beneficial impact on performance. Therefore this study will focus on RU, the second largest participation sport in the UK, in order to discover if RU players share the same perceptions as football players and identify if the athletes also find PA useful for their

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professional sporting development. As a result, the study aims to provide an in depth understanding of the views and opinions of elite level RU players currently have regarding the use of PA in improving their own playing performance and in highlighting the strengths and weaknesses of upcoming opponents.

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2.0. Literature Review

2.1. Science within Rugby Union

In August 1995, the International Rugby Board (IRB) declared the sport of RU would follow other popular international sports and turn professional. During the past two decades, the sport of RU has experienced substantial change in order to adapt to its new professional structure. Despite the enormous change and growth within the sport, there has been limited academic research to underpin new concepts and ideas, until recently (Mellalieu et al. 2008).

With advancements in technology the quantity of RU specific research has expanded rapidly, within the last five years, with current research investigating a variety of areas, including the use of global positioning satellite (GPS) devices to identify the physical demands of the sport (Hartwig et al. 2008; Coughlan et al. 2011; Hartwig et al. 2011; Higham et al. 2012, Cahill et al. 2013), eye-tracking systems to provide an in-depth understanding of the decisions players make (Downey 2012), the use of protective garments against injuries (Kahanov et al. 2005; McIntosh et al. 2009) and high-speed cameras to analyse scrummaging techniques (Quarrie & Wilson 2000; Hot et al. 2004; Habka et al. 2007; Preatoni et al. 2013). In addition to the above technological developments, the utilisation of PA has been documented for over 100 years, enhancing player feedback and understanding, with regards to player and team performances (Mellalieu et al. 2008).

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2.2. Performance Analysis

2.2.1. Historical Overview

The utilisation of PA within sport has been documented for over 100 years; Fullerton (1912), utilised a simple hand notational system to record the variety of combinations baseball players used when they produce successful hits, pitches and fields. However, it was during the late 1960's that American football teams began utilising notational systems to objectively evaluate player performance (Purdy 1977). Although with the invention of the computer, the purpose of the notation increased significantly with technology capable of enhancing, manipulating and presenting performance data in an increasingly efficient means (Franks et al. 1983).

2.2.2. Rugby Union and Performance Analysis

RU began using computerised PA in 1988, when Hughes & Williams (1988) began developing hardware and software for a computerised system. The academics aimed to record the complex events of RU utilising a QWERTY-keyboard to determine what makes a successful RU team. Analysis was conducted on five matches from the Five Nations (now Six Nations) RU tournament during two consecutive years. The study identified no significant differences between the patterns of play utilised by successful and unsuccessful teams. Although suggested, France, Ireland and Scotland utilised a different style of play to England and Wales. However, this study has

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formulated the foundations for PA within RU and provides an example of how effective it can be at identifying patterns of play within teams.

During the previous two decades a vast range of academic studies have been completed, specifically within RU, have examined rugby specific performance indicators (Bracewell 2003; Quarrie & Hopkins 2007), patterns of play (van Rooyen et al. 2006); activity rates (Cahill et al. 2013); decision making (Passos et al. 2008); profiling of teams (James et al. 2005), scoring profiles (Sasaki et al. 2007), the effects of venue on performance (Francis & Jones 2012), the tackle area (Hendricks et al. 2012) and general technical ability of players (Walsh et al. 2007). The reasons for the increasing attention within the literature, relate to PA becoming a recognised element and tool within the coaching process (Hughes 1996). The utilisation of PA has been reported to have a positive effect on both memory recall and improvements in performance (Nelson & Groom 2012).

2.3. What is Performance Analysis Used for in Elite Sport?

With individuals capable of storing 7 ± 2 chunks of information within their short-term memory (Alvarez & Cavanagh 2004), the use of PA has the ability to improve memory recall and provide a continuous supply of objective information to coaches, players and support staff (Berk 2009). The first academia to examine the ability of coaches to remember and recall events within sport was Hughes & Franks (1986). Novice coaches were requested to observe critical technical events during forty-five minutes of international soccer. The participants were divided into three equal groups and received specific

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instructions prior to or following the observed match. Each individual was requested to complete a questionnaire post-game regarding the technical skills they had observed. The results indicated that 42% of the critical events during half of a soccer match were recalled correctly, however the coaches within the study focused specifically on certain events such as set pieces and shots (see Table 2.1).

Table 2.1: Recorded percentage means from Franks & Miller's (1986) study versus Laird & Waters (2008).

Question Category	Franks & Miller (1986)	Laird & Waters (2008)
Possession	35%	32.5%
Shots	55%	18.3%
Passing	27%	70.0%
Set Pieces	71%	60.0%
Crosses	32%	37.5%
Goalkeeper Contact	33%	60.0%
Average	42%	59.2%

Franks & Miller's (1986) study was replicated by Laird & Waters (2008) utilising eight coaches who had a minimum of six months of coaching experience following the completion of a Scottish Football Association coaching award. The study identified that qualified coaches had an increased recall ability of 59.2% as the individuals had a pre-existing knowledge and familiarity with the particular sport (see Table 2.1). However, no significant differences were identified when comparing the recollection percentage and coaching

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experience/level. Although, the coaches were able to recall 59.2% of information, one of the most qualified and experienced coaches was only able to recall 46.7% and a coach with only one years experienced recollected 76.7% of information. Therefore highlighting the inconsistencies within the range of participants and emphasising the need for PA to ensure the coach and athlete are provided with 100% of the information, which they can access and re-watch at any given time.

The utilisation of video storage and modelling has increased significantly over the past few years as athletes and teams aim to discover important match determining information (O'Donoghue 2012). Koh et al. (2006) created scoring and defensive profiles to gain an understanding of the playing strategies utilised by Japanese RU teams. During the three seasons, tries were scored most frequently from lineouts and the team took an average of 32.8 seconds, 3.3 phases and completed 5.8 passes. Whereas Jones et al. (2008) identified five variables, which determined match success within RU. The research team identified achieving scrum success, scrum gain-line made, lineout success, lineout gain-line made and rucks/mauls won, determined the end match result. However, both studies fail to provide any in-depth information into how teams can create a suitable defence or ensure success is achieved at set-plays. Although, the information identified within these studies has identified what makes a successful team and therefore the coach can utilise the findings to inform the team's game plan for future matches.

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2.4. How is Performance Analysis Used in Elite Sport?

McGarry (2009: p.138) states the utilisation of PA “is widely accepted as offering useful quantitative and qualitative information to the coaches and athletes” in order to aid performance. According to Hughes (1985) PA can aid coaches and athletes via four distinctive applications: analysis of movement, tactical evaluation, technical evaluation and statistical compilation. More recently, Hughes & Bartlett (2008) identified five applications: analysis of movement, tactical evaluation, technical evaluation, development of databases and modelling, and educating coaches and players.

However, Nelson et al. (2011) and Bampouras et al. (2012) suggest, from a player’s perspective, PA has three fundamental purposes: preparing players for matches, receiving objective feedback and enhancing learning.

2.4.1. Match Preparation

According to Kolch & Tilp (2009), systematically analysing opponents matches has the ability to identify a team’s or an individual’s strengths and weaknesses. Mizrahi et al. (2006) believe for any given situation a certain number of outcomes are possible dependent upon a player’s actions, beliefs and preferences. For example, a certain rugby player will always step off their left foot when trying to evade an opponent. Von Neumann & Morgenstern (1944) referred to this concept as ‘Game Theory’ (GT) and defined a game as “any interaction between agents that is governed by a set of rules specifying the

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possible moves for each participant and a set of outcomes for each possible combination of moves”.

Whereas Bacharach (1976: p.34-37) cited in Turner (2005) suggests, “the word ‘game’ should not be understood to mean that the decisions being made are something frivolous. What is required to be a game in the sense of game theory is that there should be one or more players who are assumed to make particular plays. At the end of each play the outcomes are well defined in terms of the combination of plays, which are made. All of this should be known to the players, and the players should exercise logic in their decision-making process”. Therefore, suggesting that ‘games’ such as football and rugby are not games according to game theory, as the result of an individual’s strategy is unknown by his or her opponent and the event is continuous. However, McMillan (2005) believes RU is a game, according to the ‘game theory’ definition. The sport involves strategic thinking and anticipating the opponent’s reactions, thus it is up to the individual when to react with their own actions.

The actions of a specific individual during an event can be explained by examining the decision situation. Research has identified that when an individual is deciding how to act, they do not consider the society, structure or system already associated with the individual (Dowding 2012; Starcke & Brand 2012). As a result, they consider the actions other individuals are likely to select. Therefore, the individual’s decision selection must be practiced within

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training to examine the individual's selected decision and provided with additional information, which may assist their selection.

This additional information maybe provided by PA, as Garganta (2009: p.81) suggests it offers "the opportunity to identify match regularities and random features of game events". Additionally, O'Donoghue (2010: p.xiv) explains the purpose of PA "is to identify areas requiring attention and to support decisions about match preparation that will result in a more successful outcome". Therefore, if coaches and players are aware of this information, an appropriate tactical game plan can be designed to combat the teams and specific individual's strengths. Although to ensure players are able to recall this information during matches, an effective delivery method must be adopted (Groom et al. 2012).

According to Novak (2010), involving athletes within the creation and delivery of presentation enhance memory recall. However, if athletes are excluded or restricted from involvement, they enter the unavoidable predicament of 'self-fulfilling prophecy' (Goffman 1991). For example, if an athlete is actively excluded from involvement within the PA process, then no opportunities have been provided for the necessary skills to be developed and thus the exclusion escalates and therefore the athlete's appreciation of the process reduces. Whereas if the athlete is given responsibility for collecting and presenting essential information, then they are provided with a learning environment for developing the required skills and as a result the athlete's acceptance of the PA

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process increases. Although this responsibility and opportunity to develop independent learners must be managed to ensure members remain on task (Leatherwood 2006).

2.4.2. Learning

The utilisation of video technology and PA has been identified as an effective strategy to enhance learning within a variety of occupational fields (Scherer et al. 2003; Romanov & Nevgi 2007; Ste-Marie 2013). Although, Cao & Nishihara (2012) suggest how individuals prefer to learn can impact the effectiveness of video as a learning tool. During the past century, academics have attempted to gain a comprehensive understanding of how humans learn and as a result a total of 71 theoretical learning style models currently exist (Cao & Nishihara 2012). Although academics have not accepted a unanimous model, but rather several similar classifications and scales are utilised (e.g. Honey & Mumford 1986; Felder & Silverman 1988; Flemming 2006).

Honey & Mumford (1986) adapted Kolb's (1984) to encompass four different axes (activist, pragmatists, reflectors & theorists) and in order to become an effective learner, the individual must be able to adapt to all four axes dependent upon the learning environment. However, if the learner is unable to adapt to the learning environment the learner will struggle to adapt and absorb new information. Duff (2001) explains how the model works on a dual orthogonal dimension (transformation: activist – reflector or prehension: theorist – pragmatist); the transformation dimension explains the transformation of

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learning information via internal reflection, whereas the prehension dimension describes the understanding of information through direct experience, emphasising intuitive qualities.

Whereas Felder & Silverman (1988: p.674) state “students learn in many ways— by seeing and hearing; reflecting and acting; reasoning logically and intuitively; memorizing and visualizing and drawing analogies and building mathematical models; steadily and in fits and starts”. From this initial assessment, the research team grouped the learning preferences into five categories (see Table 2.2). The five categories have been formed by previous theoretical models, for example the active reflective component draws upon a prior model developed by Kolb (1984) and the sensing intuition element has been established through the utilisation of Jung’s psychological type theory (1923). Felder & Silverman believe a student’s learning style can be determined by the student’s preferred information type, sensory channel, organisation of information, processor and understanding mechanism.

Table 2.2: Dimensions of learning (Adapted from Felder & Silverman 1988)

Preferred Learning Style	
Sensory Intuitive	> Perception
Visual Auditory	> Input
Inductive Deductive	> Organisational
Active Reflective	> Processing
Sequential Global	> Understanding

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More recently, Flemming (2006) redeveloped a three component model (visual, aural, read/write) designed by Flemming & Mills (1992) into a four element model (visual, aural, read/write and kinaesthetic), to describe how individuals learn. The model requires students to select the most appropriate and relevant element to their learning needs; this selection will help the educator in structuring resources and activities. As a result Othmn & Amiruddin (2010) believe VARK learning styles “can be perceived as an individual method that one uses for the purpose of acquiring knowledge, positive skills and attitude”. Although, Jerome (2010) identified the VARK model suggests learners fall into one category, irrelevant of the learning environment and/or task.

However, the above mentioned theoretical models are not too dissimilar as they all focus on cognitive styles, environmental preferences, personality types and/or sensory modalities. Although, Riener & Willingham (2010) believe individuals do not favour towards a specific learning style and the theoretical underpinning is a myth. The pair believe individuals have a preferred method dependent on task, where the individual has learnt that they will experience a high ability and achieve success. Therefore suggesting the student learns best from observation and prior experience to determine their favoured learning style.

During the discussion surrounding learning, all of the subjects have been students at either higher education or further education faculties. Whereas Gonzalez-Halo et al. (2010) conducted a study to identify if athletes have a

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preferred learning style or whether this was dependent upon the task in hand. A range of recreational, semi-elite and elite athletes from a mixture of sports completed an adapted learning style questionnaire (Honey & Mumford 1986). The findings of the study highlighted that no significant differences were discovered, however the opportunity to observe performances was highlighted as a preferred method, agreeing with Riener & Willingham's (2010) conclusions. Ali & Khan (2012) suggest in addition to learning through observation, athletes require the influence of feedback to support learning.

2.4.3. Feedback

"Feedback allows one to compare the actual state with the target state and discover a discrepancy between actual and desired achievement" (Krenn et al. 2013). Therefore enabling an individual to evaluate their previous performance, learn and set realistic and specific goals to improve performance. Feedback can be viewed as intrinsic (from within) or extrinsic (from external sources).

Hodges & Franks (2008) identified intrinsic feedback involves outcome information gained from a human's senses, audition, proprioception and vision. For example, if a player completes a kick within RU the athlete sees three things; where the kick finishes, how the kick felt and how the kick sounded as it left the foot. However, the athlete is only able to gain minimal information and thus requires the assistance of extrinsic feedback to provide a visual element to the information being provided via the coach (Wulf & Shea 2004).

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Extrinsic feedback can be provided as either knowledge of results (KR) or knowledge of performance (KP). According to Weinstein & Schmidt (1990: p.677), KR “refers to the extrinsic information about the task success provided to the performer after a practice trial has been completed...it serves as a basis for error corrections on the next trial and as such can lead to more effective performance as practice continues”. Whereas KP “helps performers interpret the quality of their actual movements” (Schmidt & Wrisberg 2008: p. 289). Therefore, if we relate back to the example of the kick in RU, KP provides information about the technique utilised by the athlete and KR informs the athlete of the outcome of the kick.

Extensive research has been conducted to identify whether receiving KP is more effective in improving task success than KR (e.g. Christoffersen 1990; Zubiaur et al. 1999; Mononen et al. 2002; Mononen et al. 2003; Cirstea & Levin 2007). Bilodeau & Bilodeau (1961: p.276) identified “there is no improvement without KR, progressive improvement with it and deterioration after it’s withdrawal”. Whereas Zubiaur et al. (1999: p.223) suggested “KP is a more effective for improving learning and if “there may be interference across information if knowledge of results is provided after knowledge of performance”. Similar results were identified by Mononen et al. (2002, 2003), who identified KP improved the shooting accuracy of athletes, but improvements were not identified in a 10-day retest. Additionally, stroke survivors showed improvement in movement when attention was directed to KP rather than KR (Cirstea & Levin 2007). Although, Lidor (1996) recommends athletes should receive a

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combination of KR and KP in order to enhance performance in shooting and throwing tasks. More recently, Triano et al. (2012: p.732) suggest, “feedback should involve both KP and KR that compares performance to a tangible standard”. However, the timing and order of feedback is essential for underpinning the links to performance improvement and learning (Ashby & Maddox 2005).

The effect of timing of feedback upon learning has received a vast quantity of research within the past decade. Butler et al. (2007) identified that receiving delayed feedback enhanced final test results in comparison to immediate feedback on a multi-choice test. Astwood (2009: p.7248) also identified “teams that had received delayed feedback outperformed those that had received immediate feedback on the retention test”. Although Astwood (2009: p.7248) discovered “that the timing of feedback had no impact on acquisition performance”. Whereas Smith et al. (2008) identified no significant difference, regarding task performance, between a group of students when receiving either immediate or delayed feedback.

However Brosvic et al. (2006) believes immediate feedback enhances individuals learning when compared to delayed feedback. The research teams views are shared by Mahoney et al. (2008: p.39) who stated “immediate feedback provides a better opportunity to improve or correct performance when compared with delayed feedback”. Additionally, Kirby (2009) discovered the use

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of immediate feedback via video assisted alpine skiers in enhancing their knowledge of carving skills and overall performance.

Whereas Raab et al. (2005) suggests receiving both immediate and delayed feedback has a greater impact on the development of decision making skills in table tennis, as individuals are provided with initial information which is then added to after a period of self-reflection. In support of the above findings, Liberatore & Luyben (2009) discovered that dancers should receive immediate group feedback and delayed individual feedback to enhance performance overall. However Evans & Waring (2011) believe the reason for the large differences in delayed versus immediate feedback and it's effect on task performance is due to players learning preferences and what they believe works best for their learning.

2.5. Players Perspective

A recent move in literature has begun to investigate the beliefs, values, attitudes and perceptions of players towards a variety of tools including sport science support (e.g. Clement & Shannon 2011; Martindale & Nash 2013) and performance analysis (e.g. Reeves & Roberts 2013). Bampouras et al. (2012) highlighted that athletes are both the object of performance and the receiver of support. Without the knowledge of their opinions towards specific training methods and tools, coaches are unable to tailor training to meet player's desired development needs. Recent player perception research in sport can be divided into two categories. Firstly, those concerning player's views towards

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sporting staff and secondly, the player's attitudes and thoughts regarding specific training tools and methods.

2.5.1. Player Perceptions towards Sport Personnel

Researchers have argued the importance of understanding player's attitudes and beliefs towards performance staff so as to improve the quality of the experience (e.g. Lubker et al. 2008; Lovell et al. 2013). Durand-Bush & Salmela (2002) interviewed six Olympic and/or world champions to identify the important components of their success. The majority of the athletes had worked with specific support staff, such as strength and conditioners, physiologists, psychologists, physiotherapists and nutritionists, in order to provide in depth knowledge where the coach was not an expert. The athletes suggested the staff had to be experienced, hardworking, reliable and compatible with other members of the team. In addition, "these assistants had to have high standards and contribute to the creation of an environment conducive to high quality training" (Durand-Bush & Salmela 2002: p.165).

Lubker et al. (2008) identified a similar skill set required for support staff to have acquired, specifically within the field of sport psychology. A total of 124 athletes completed a questionnaire, which evaluated the necessary skill sets using a series of 31 questions. The athletes suggested having "positive interpersonal skills, knowledge, and sport culture, as being highly important to the effectiveness of a SPC [sport psychology consultant] working with a sport team or individual athlete" as essential skills and characteristics for support staff. In

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comparison to Durand-Bush & Salmela (2002), Lubker et al. (2008) identified the importance of interpersonal skills and developing a relationship with the athletes and therefore gaining their trust and confidence.

Previous research has identified that staff's gender, race and physical appearance are important variables, which sometimes influence an individual's perception of their competence (Thelwell et al. 2010). Recently, Lovell et al. (2013) investigated whether a sport's dietitian's effectiveness was affected by their personal appearance. The findings of the study highlighted that athletes sometimes utilise non-verbal cues to inform their decisions regarding a sport dietitian's efficiency. The cues athletes utilise regarding the staff's physical appearance, sometimes include the individual's body mass index and/or their personal attire. As a result, if the athlete's initial assessment is negative, the development of a relationship between the athlete and the dietitian is likely to be ineffective.

The effectiveness of a working relationship has been highlighted as an important element in gaining athlete's belief regarding the utilisation of a specific sport science discipline. Donohue et al. (2004) suggest once this relationship has been effectively made, players will be more accepting to the introduction of new training methods and tools.

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2.5.2. Player Perceptions towards Training Methods and Tools

With players looking to gain any advantage over their opponent, the introduction of new training methods and tools by support staff are becoming a regular occurrence in elite sport (Kratochvíl & Rozsypal 2010). Bloom et al. (2003) undertook focus groups with high school athletes to assess the perceptions of the effectiveness of sport psychology. The consensus from the athletes was that all coaches and athletes should use a sport psychologist, as at some point each individual needs help mentally. Regarding the structure of the support, the athletes suggested individual sessions, as these created a personal and private atmosphere. Although, the athletes were aware of the facilitator of the focus group's background within sport psychology, and therefore the results may not provide a true representation of the athlete's perceptions.

Donohue et al. (2004) highlighted athlete's caution to new training tools. Athletes identified discussing the positive and negative benefits of sport psychology, along with the personal and performance benefits, was effective in changing athlete's perception in comparison to discussing the individual's sporting experience. Although, athletes still remained sceptical to discussing personal issues with an unfamiliar consultant. This highlighted the importance of establishing a working relationship whereby athletes are comfortable in confiding information with an expert (Lubker et al. 2008).

Regarding other sport science methods, Poiss et al. (2004) investigated the perceived importance of undertaking weight training in American athletes from a

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range of sports. Of the 304 athletes, men and women perceived weight training as an essential requirement to sport-specific training, whereas men believed it was also essential for general training. The athletes also highlighted that training was fun and as a result enjoyed performing the exercises. Edmunds et al. (2006) identified if athletes are enjoying undertaking the exercise, their level of intrinsic motivation will remain high and continue with performing the task to maximum effort. However, the coach and support staff must play a fundamental role in supporting and educating the players, which also has an effect on the individual's perception. Therefore if this support and guidance is provided and the athlete feels comfortable in the created environment, they will have had a positive experience and thus perceive weight training as essential to their performance (Poiss et al. 2004).

Another performance tool, which athletes perceived as important to their improvements with development was the use of performance profiles (Weston et al. 2011). The research team initially interviewed eight RU players, which was then followed by dividing 191 athletes between 10 focus groups, in order to gain an opinion towards the usefulness of performance profiling. The focus groups identified six reasons why they were effective, "(1) raising their self-awareness; (2) helping them decide what they need to work on; (3) motivating them to improve; (4) setting goals for themselves; (5) monitoring and evaluating their performance; and (6) taking more responsibility for their development" (Weston et al. 2011: p.173). In addition, athletes identified that performance profiling

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should be completed following PA sessions, enabling players to objectively evaluate their own and other's performances (Weston et al. 2011).

2.5.3. Player Perceptions in Performance Analysis

Although PA has been utilised in sport for over 100 years, limited research has been undertaken to investigate the views and opinions of players towards the sport science discipline. The principal study to look into individual player's perceptions of PA in sport was conducted by Groom & Cushion (2005). A group of ten, under 17 year old professional youth footballers received ten video analysis sessions throughout a season, and evaluated their thoughts utilising a semi-structured questionnaire. The questions were divided into five key categories (mental aspects, learning, reflection, timing and usefulness), which had been identified in a previous study completed by Groom & Cushion (2004).

The players within Groom & Cushion's (2005: p.45) study suggested "video feedback has been demonstrated to be a useful tool to stimulate player's learning providing the player with the opportunity to improve game understanding and decision-making, recognise individual and team strengths, improve individual and team weaknesses and develop analytical skills". In addition, PA was identified as a useful reflection tool, building confidence, pride, determination and commitment within a player's performance. However, the athletes within the study only received a team PA feedback session following a match, and did not have any experience of using PA during the week to enhance individual skills in preparation for upcoming opponents.

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Nelson et al. (2011) conducted four semi-structured interviews with a semi-professional ice hockey player that had experience of receiving video-based feedback for team and individual skill development. The study aimed to provide a rich insight into the player's opinion towards the utilisation of PA in elite sport as a learning tool. The player highlighted the importance of developing respect and a suitable working relationship between the coach and the athlete, to ensure the athlete accepts the video feedback. Previous studies have highlighted the importance of building an effective coach-athlete relationship when utilising new technology to enhance practice (Lubker et al. 2008). However, Nelson et al. (2011) acknowledged the single case study design, as a limitation to the research and suggested further research should be conducted in order to collect a greater insight into PA within ice hockey. Although, the study has provided an initial insight into the thoughts of an ice hockey player towards PA and therefore has enhanced the understanding of player's perceptions whilst experiencing PA support.

Bampouras et al. (2012) examined the player's perceptions towards PA from an applied approach, whilst also gaining the thoughts and opinions of a coach and an analyst. The three individuals who were interviewed were not connected and represented three different sports (Netball, Tae Kwon Do and RU). The main finding from the study indicated that the athlete is both the object and receiver of the PA process, although has little involvement within the process itself. However, the athlete who was interviewed highlighted the desire for

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involvement and an opportunity to input into the process. These comments were also shared by the athlete in Nelson and others' (2011: p.10) study who spoke about the combined role within one teams PA process, stating "you almost wanted to see something that you had done wrong, because you could then get a coach's perspective or the other player's perspectives of what you should have done".

However, Bampouras et al. (2012) also discovered that players were not informed of the benefits of the additional support and therefore were sceptical of the training tool. The player stated, "a new coach came in, new ideas and he said this is what we will be doing...It is not like we were given a choice it was just put to us" (Bampouras et al. 2012: p.473). Players were also excluded from having an active role in the process, as coaches believed players were unable to identify any particular issues with a performance and were unable to cope with the information.

Within Reeves & Roberts (2013: p.204) study, players identified having an active role in the PA process allowed them to become self-learners and their own analysis became "an integral part of their working week, their routine and how they prepared". The study interviewed five academy players from a premier league club, their head coach and two analysts in order to gain a comprehensive insight into the views of one football club's academy towards PA. A total of three themes emerged from the interviews; "(a) Perceived impact of performance analysis upon individual and team performance, (b) Reflection

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on performance, (c) Psychological implications associated with video-based performance analysis feedback” (Reeves & Roberts 2013: p.203). The players believed PA was utilised to assist in identifying weaknesses and incorrect actions. However, Bampouras et al. (2012) identified that PA can help a player to receive objective feedback, learn how to make improvements to the execution of skills and prepare for upcoming matches. Although the coach and the analyst within the study acknowledged that each player is unique and therefore feedback mechanisms, whilst using video, have to be tailored to individual learning preferences (Reeves & Roberts 2013).

2.6. Purpose of Study

In response to the above research findings, Bampouras et al. (2012) suggested there has been limited empirical research that related directly to utilisation of PA by professional athletes and the impact this technology has upon their playing performance. In addition, Reeves & Roberts (2013) states “there is also a notable absence of PA studies to have examined the effectiveness of PA procedures from a playing perspective”. According to Lubker et al. (2008), having an insight into player’s views and opinions towards a specific service, allows staff to cater the provision in order to allow for individual preferences. Although, Aksu (2009) suggests utilising two methods of data collection, ensuring the collected data truly represents the participants’ views and comments and therefore enhances knowledge within the field being investigated.

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3.0. Methodology

3.1. Research Design

The study of this Master's dissertation was a typical descriptive case study, allowing for a deep, rich and revealing insight into the thoughts and perceptions of RU players towards PA (Yin 2011). The data for the pilot study and the main study was collected during the 2012 to 2013 northern hemisphere RU season. The pilot study was conducted in March 2013, with the main study being completed in the following month, April 2013.

The research examined 75 RU player's perceptions towards the use of PA within RU from two RU clubs within Great Britain. A pilot study was conducted, prior to main data collection, to examine the credibility, transferability, dependability and conformability of the proposed method, data collection tools and procedures (Blessing & Chakrabarti 2009). Results collected from the pilot study were utilised to strengthen the main studies design. A systematic flow chart of the research design is illustrated in figure 3.1.

3.2. Ethical Approval

Following the submission of a University of Worcester ethics checklist (see Appendix 3.1) and ethics form (see Appendix 3.2), the study was granted ethical approval from the Institute of Sport and Exercise Science ethics committee at the University of Worcester. The study will require the cooperation of gatekeepers (Director of Rugby) throughout the study, as permission to access the RU players is required. Following gaining permission from the

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gatekeeper at each club, individuals will be required to complete an informed consent form (see Appendix 3.3 & 3.4).

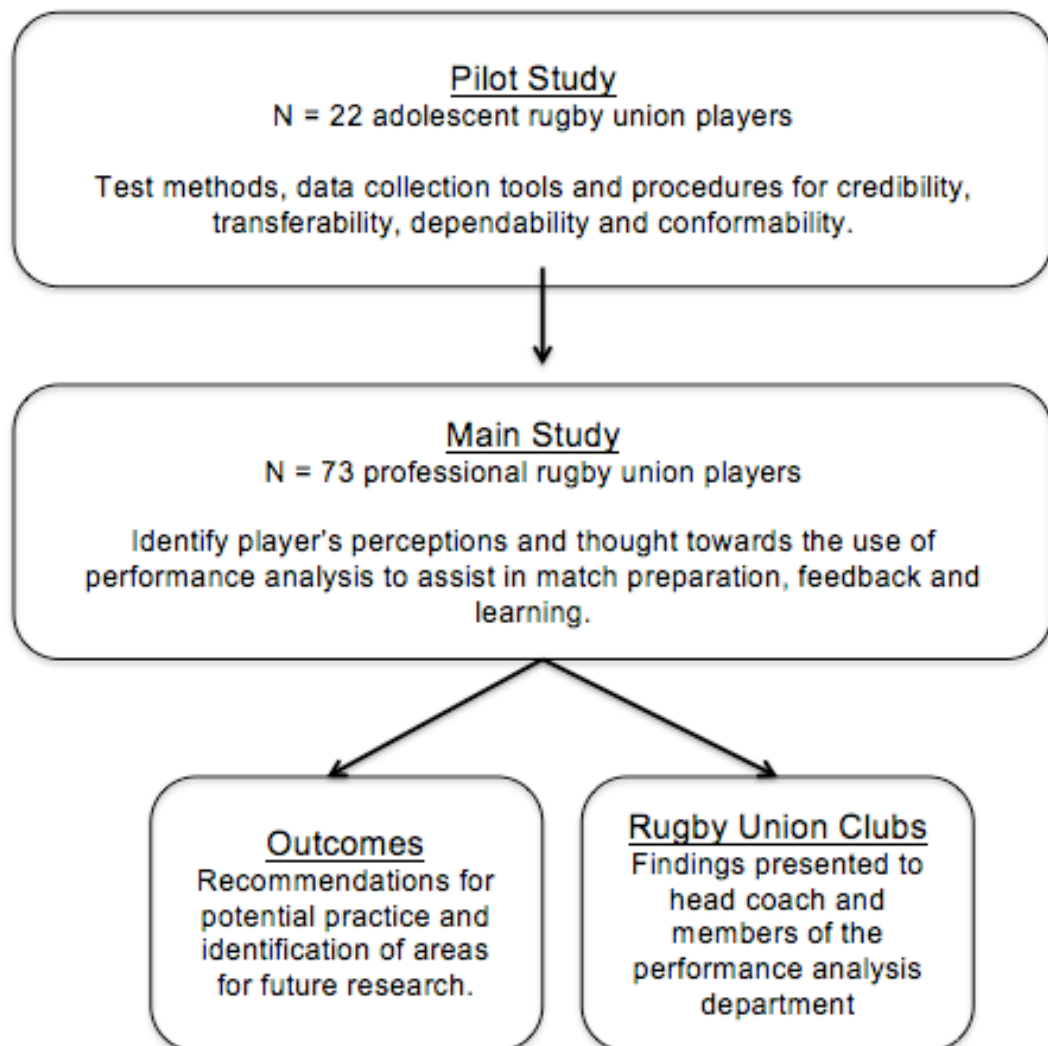


Figure 3.1: A systematic diagram illustrating the research design.

3.3. Pilot Study Methodology

In order to gain a better understanding of players perceptions towards PA in RU, a questionnaire and interview had to be developed and piloted. Van Teijlingen & Hundley (2002: p.33) highlighted the importance of conducting pilot studies stating they “fulfil a range of important functions and can provide

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valuable insights” into potential weaknesses and the methodological design. The questionnaire and interview questions had not previously been utilised in previous academic studies and therefore the credibility, transferability, dependability and conformability needed to be established.

3.3.1. Participants

To conduct the pilot study, two sampling techniques were utilised on two separate occasions. Firstly, a non-purposive convenience quota sampling technique was utilised to recruited participants, for involvement within a questionnaire (Vertes & Ste-Marie 2013). Twenty-two participants, who were members of an English premiership RU club’s Advanced Apprenticeship in Sporting Excellence (AASE) scheme, completed the questionnaire. The selected participants (Number (N) = 22) were all male athletes who had an age range from 17 to 19 years of age (Mean (M) = 17.65, Standard Deviation (SD) = 0.81) (see Table 3.1). The club’s AASE coach was approached and provided with information regarding the study prior to receiving written agreement for his players to take part in the pilot study. Players within the AASE scheme receive weekly PA sessions and have access to footage of previous and upcoming opponents matches.

Table 3.1: Pilot Study Participant Information

Age in years (M±SD)	Player Position		Nationality		Level of Performance	
17.59 ± 0.79	Front-Row	18.1%	British	95.5%	AASE	27.0%
	Second-Row	0.0%	Japanese	4.5%	Club	13.5%
	Back-Row	22.6%			County	40.5%
	Half-Backs	27.4%			International	18.1%
	Centres	27.4%			(Age grade)	
	Back Three	4.5%				

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Secondly, utilising a purposive random sampling technique (McNoe & Chalmers 2010), one participant was selected to undertake an interview from an elite RU club's team list. The participant was an elite British male RU player (Age 25 years and 11 months) who competes in the fullback position. Prior to selecting the participant, the head coach of the premiership RU team was approached regarding participation of his players within the study. The individual receives daily PA sessions and has access to previous and upcoming opponents matches via the club's internal server.

3.3.2. Data Collection

Taking into consideration previous studies within the area of player perceptions towards PA, the utilisation of a questionnaire and an interview was selected as the data collection tools for the study.

3.3.2.1. Player Perceptions Questionnaire

A semi-structured questionnaire was designed, drawing upon Groom & Cushion's (2005) research and the identified themes by Bampouras et al. (2012) (see Appendix 3.5). Groom & Cushion's (2005) designed a questionnaire, which investigated five key areas; usefulness, learning, reflection, timing and mental aspects, previously identified by Groom & Cushion (2004). Whereas Bampouras et al. (2012) suggested PA is used for match preparation, feedback and to promote athlete's learning. As a result the questionnaire focused on nine themes; PA requirements, delivery methods,

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training and support, usefulness, learning, feedback, match preparation, player involvement and coach-athlete relationship.

The participants completed the questionnaire on a training day in the presence of only the researcher. The participants took between 20 and 30 minutes to complete the questionnaire. However, when analysing the questionnaires only 18.1% of the participants had answered all 28 questions whereas 85.5% of the participants had managed to answer all of the first 20 questions. Therefore suggesting the length of the questionnaire, five pages, needed to be reduced to ensure participants were able to answer all of the questions. Gillham (2004) suggests questionnaires should be contained within four pages and the most important questions should be placed towards the start of the questionnaire.

Although no direct feedback was collected regarding the content of the questionnaire, the collected results suggested too many topics had been covered. The conclusion for the above comment was created as information regarding each topic was vague and left the participant repeating comments on a number of occasions. For example, participant one answered two questions with similar responses, firstly "help rectify problems from previous games to improve on" and secondly, "it allows you to see how to improve and what you are currently doing". In addition, player 13 responds to different questions with similar responses, "direct to the positives of performance and what needs to improve for future games" and "you can look at previous matches you played against the opponents and how you did and what you need to do to improve in

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order to have a better game”. The majority of questions received one-word answers stating ‘yes’ or ‘no’ leaving minimal detail regarding the player’s thoughts towards specific areas where PA is utilised.

The responses collected from the pilot study have indicated that the players find using PA useful for three main purposes; preparing for upcoming matches, receiving objective feedback and enhancing learning. The mentioned themes were identified in previous research conducted by Bampouras et al. (2012) and therefore the questions will be revised and reduced to focus on drawing out player’s thoughts and opinions surrounding the three identified topics. The additional themes, which were utilised from Groom and Cushion’s (2005) study, will be removed and more theme specific questions will be created. In addition, the completion of the pilot study also suggests some of the questions require rephrasing in order to clarify the participant’s written answer and extend their response from a single word answer into a long structured reply.

3.3.2.2. Player Perceptions Interview

Similarly, the interview questions were based upon the same nine themes utilised to design the questionnaire (see Appendix 3.6). The purpose of conducting interviews is to try and draw out real-life examples from participants and provides clarity to conflicting issues raised by those who completed an adjoining questionnaire (Corti & Thompson 2004). After completing an informed consent form (see Appendix 3.7), the interviewer utilised the nine pre-determined themes to direct but not lead the conversation. The interview lasted

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25 minutes and was transcribed verbatim, utilising Microsoft Word (Microsoft Corporation, USA), post-interview (Halcomb & Davidson 2006). After the interview was transcribed, a copy of the transcript was presented to the interviewee for member-checking to ensure the content of the interview had been transcribed correctly and truly presented the individual's views (Carlson 2010).

Although the interview provided an in-depth insight to the player's use and opinions of PA within RU, it failed to build upon the information collected within the questionnaire answers (see Appendix 3.8). The interview collected a greater depth of content for each question within the questionnaire. For example, within the questionnaire players responded to a question regarding active role within PA sessions with a simple 'yes' or 'no' answer, whereas the interviewee responded "yes I think to a certain extent because I think it is something I have sort after myself and naturally I think I probably take in a little bit more". However, the interview questions selected, did not draw out any personal examples relevant to the individual's experiences. Therefore the semi-structured questions selected, need to firstly be different than the questionnaire questions and secondly, aim to gain personal examples of the player's thoughts towards PA.

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3.4. General Methodology

Taking into consideration the findings from the pilot study a number of changes to the methodology were conducted and used within the study, which are outlined below.

3.4.1. Participants

A total of 73 male elite RU players from two RU clubs, who compete in the Aviva Premiership and the RaboDirect Pro12 (see Table 3.2), volunteered for participation within the study. The participants were selected through non-purposive convenience sampling as the researcher had already established links with the two RU clubs. In addition, four participants (two per club) were selected utilising purposive random sampling technique to undertake an interview (see Table 3.3). The two RU clubs utilise PA during the planning, delivery and reviewing processes of the team and players. In addition, the players have access to a dedicated PA room with computers connected to a database of coded matches for both individual and team analysis.

Table 3.2: Participant Information

Age in years (M±SD)	Player Position		Nationality		Level of Performance	
25.23± 4.44	Front-Row	23.29%	British	43.84%	Club	42.46%
	Second-Row	9.59%	Welsh	38.36%	Inter (Age)	10.96%
	Back-Row	21.92%	Fijian	4.11%	Inter (7s)	9.59%
	Half-Backs	17.81%	Irish	2.74%	Inter (Full)	35.62%
	Centres	13.70%	SA	2.74%	Inter (Rep)	1.37%
	Back Three	13.70%	Tongan	2.74%		
			NZ	1.37%		
			Samoan	1.37%		
			Scottish	1.37%		
			Other	1.37%		

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Table 3.3: Interview Participation Information

Age in years (M±SD)	Player Position		Nationality		Level of Performance	
25.5± 3.70	Front-Row	25.00%	British	50.00%	Club	25.00%
	Second-Row	0.00%	Welsh	50.00%	Inter (Age)	25.00%
	Back-Row	25.00%			Inter (Full)	50.00%
	Half-Backs	25.00%				
	Centres	25.00%				
	Back Three	0.00%				

3.4.2. Data Collection

3.4.2.1. Questionnaire

Taking into consideration the findings from conducting a pilot questionnaire, the questionnaire was restructured, reduced and certain questions re-written (see Appendix 9). The questionnaire contains 26 questions, which aim to gain the thoughts and opinions of RU players towards PA. The questionnaire utilises a semi-structured design and has three main sections, which include a range of open-ended and close-ended questions. The open-ended questions encourage the participant to provide in depth answers, utilising their own knowledge, experiences and feelings (Salomon & Cairns 2011). Whereas the close-ended questions utilised a Likert scale (1=very important, 5=very unimportant) in order to gauge participant's attitudes and thoughts on a measurable scale (Likert 1932; Anton & Rodriguez 2011).

3.4.2.2. Interview Questions

The main interview questions were created with the aim of drawing out real-life examples where PA has assisted or inhibited the player's development and as

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a result gaining a detailed understanding of why they have developed their perception of PA. Each participant was asked four pre-set questions and then questions which arose from their answers (see Appendix 3.10). The reason for selecting this interview type, semi-structured, was to allow the participant to speak freely and openly about their own personal experiences with PA and what they thought of its use in enhancing performance.

3.4.3. Method

Prior to data collection, consent was gained from the head coach at each club for their players to take part in the study (see Appendix 3.11). Questionnaires were completed during a training day at each club's training venue under the supervision of the researcher. All participants completed the questionnaire exploring player's perceptions towards PA in RU. Once participants had completed the questionnaire, two participants were randomly selected from the squad's team list to undertake an interview (see Appendix 3.12). The interviews were carried out in a quiet room in the training venue. Interviews lasted an average of three minutes and 31 seconds and were transcribed verbatim. Following the interview, the content was transcribed utilising Microsoft Word (Microsoft Corporation, USA) and a copy of the transcript provided to the athlete for member-checking on the same day as the interview (see Appendix 3.13).

3.4.5. Data Analysis

With regards to the information gathered through the completion of questions involving a Likert scale, the findings will be shown as the mean and standard deviation (Boone & Boone 2012). The collected data from the interview and

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open-ended questionnaire was exposed to inductive content analysis (Elo & Kyngas 2008; Nelson et al. 2013). The procedure for undertaking inductive content analysis followed a three-stage process (Scanlan et al. 1989; Miles & Huberman 1994; Patton 2002):

1. Identification

The emerging raw data themes were coded as meaningful units, which comprised of paraphrased quotes or quotes.

2. Grouping

Similar meaningful units of text were grouped together to create lower-order themes. The answers to each question, during the interview or the completion of the questionnaire, were treated as separate meaning units, however if they contained more than two key points they were divided accordingly.

3. Categorising

Similar lower-order themes were then categorised into higher-order themes and assigned a descriptive name, which explained the general meaning of the theme.

A small sample of questionnaires (10%) was selected for triangulation (Patton 2002) by one of the analysts at a professional RU club, who had recently completed a Master's degree. Following the analyst's inductive content analysis, both parties discussed the inductive content analysis until an agreement had been reached on the categorisation of all raw data into the relevant themes.

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4.0. Results and Discussion

Whilst undertaking the analysis of the questionnaires (see Appendix 3.9), players indicated an importance towards the use PA regarding their performance (1.78 ± 0.96), analysing opponent's overall performance (1.94 ± 0.99), analysing opponent's strengths (1.78 ± 0.91), analysing opponent's weaknesses (1.51 ± 0.75) and analysing opponent's game plan (1.82 ± 0.90) within a scale of 1 to 5 (1 = very important, 5 = very unimportant). In addition to these quantitative measures, four themes emerged whilst undertaking the inductive content analysis of the interview transcripts and questionnaire responses: utilising video for player improvement, preparing for a match, using video for reflection and other psychological tools, and finally, player suggestions for improvements.

4.1. Utilising Video for Player Improvement

One of the most common emerging themes was regarding the use of video to continue to develop and improve player's ability and knowledge. The players associated video as a learning tool, enabling them to view areas they 'need to improve and how to do it' (Questionnaire(Q)2) but also 'seeing mistakes and missed opportunities' (Q70). Video enables players to see the whole picture in an objective perspective rather than their own subjective feeling, allowing players to 'check what other options were available' (Q47). This objective information allows coaches to deliver meaningful and accurate feedback to the players regarding individual and team performances.

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Van Wieringen et al. (1989) identified players who received video feedback following a 30 minute practical session, were able to achieve higher match scores and achieve greater technique scores, when compared to a control group. These findings are supported by Boyer et al. (2009) who also identified the use of video feedback supported the learning and development of skills within gymnastics. However, the study also identified that the use of PA could increase athlete performance to above baseline level (70%), although to achieve 80-100% it was solely down to the gymnast. The coaches and gymnasts praised the use of video and its ability to slow down the video in order to tell the full story of what was happening to the gymnast's body whilst completing high-speed moves. The RU players praised this feature stating being 'able to slow down footage to be able to look at a more holistic picture' (Q69) in order to observe the bigger picture and 'highlight problems' (Q3) is a positive.

The feedback players receive can be provided in two forms (Vander Linden 1993): immediate (Bowman & Laurent 2011) and delayed (Faulkner et al. 2011). Metcalfe et al. (2009) suggests immediate feedback is provided to the athlete at the time or during the event or activity. The use of immediate feedback within RU, can be utilised during training sessions or matches in order to enhance performance as it is happening. During an interview, the participant describes his use of immediate feedback:

"We could video a scrummaging session and watch it on a delay before we go into the next scrum...I like learning like that because rather than watching 12 or 15 clips and watching them at the end of a session, you

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can watch them and pick up one or two things immediately” (see Appendix 4.3)

These comments are shared by a number of players who suggested ‘it gives you real time feedback’ (Q59) and you are “able to breakdown the motor movements as it happens” (Q50). Wulf et al. (2010) believe athletes should be provided with video when providing immediate feedback to ensure they understand the context. Additionally, Liu (1995) discovered “immediate visual feedback about performance outcome enhances performance whereas subjective estimation of movement production error during the KR [Knowledge of Results]-delay and/or the post-KR intervals enhances skill learning”.

More recently, Holt et al. (2012) identified when players received immediate feedback, during a training session, their level of skill execution increased as well as their consistency level. Research suggests coaches are able to provide immediate feedback with the support of video when the session has a greater emphasis on skill, where the focus is on task success (Sanderson & McClements 1998; Holt et al. 2012). Whereas delayed video feedback is more suited to match feedback or training feedback where the session has a greater tactical emphasis (Raab et al. 2005). This is also highlighted during an interview:

“We have had an iPad there [on the side of the pitch] and because the sessions are not individual, when you’re out there, it would be quite start and stop, and the boys get stiff”, but “when we train we get filmed...you get a big break at lunch time and so you get to go in and all the training is put on the server and individually you can have a look or go over with the coaches and have a look at what you can improve” (see Appendix 4.2)

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Whereas the player who was interviewed as part of interview three preferred receiving immediate feedback, but player two suggested he prefers “coming in after training and looking at the footage and then the next day I can come out and do it properly” and thus receiving delayed feedback. Delayed feedback is “a form of corrective feedback provided after a delay so that athletes have time to think about their performance” (Vickers 2007: p.196). Lawrence et al. (2013: p. 39) believe delayed feedback assists in promoting athlete problem solving and encouraging the individual “to explore the dynamics of a skill while utilising task intrinsic feedback”.

Players reported that delayed video feedback is the most commonly utilised within the training week. The coaches use delayed feedback to provide “regular group feedback sessions as well as individual feedback sessions” (Q69) throughout the training week, with the purpose of ‘taking the negatives and turning them into positives’ (Q15). However, players suggested group sessions were ‘too long’ (Q18, 20) and showed too ‘many clips’ (Q50). One of the interviewed players highlighted these comments:

“We have had it this year where we are shown a mass of information where some of it is not necessary...short clips so this is what we do, show the clip and explain what to do rather than showing lots and lots of different clips that aren’t really relevant, show the important ones and show them once instead of showing the same situation against five different teams.” (see Appendix 4.4)

However, coaches seemed to cater to individual’s learning styles by offering information in a number of forms, although visual information was the

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predominant method. During the feedback meetings, coaches would talk (auditory) through the clips (visual) and provide a 'feedback sheet' (Q23) (read) in order to outline 'what I do well' (Q43) and highlight areas for future improvement. According to Fleming & Mills (1992), in order to ensure feedback is remembered and thus learning is achieved, an individual learns in one of four modalities: visual, auditory, read/write and kinaesthetic. Whereas Honey & Mumford (2000) believe individuals do not have a preference to a learning style, but instead move between the four modalities dependent upon the situation and the individual's learning experience. Wesley (2004) identified athletes preferred a visual or active learning style in order to enhance learning. Therefore suggesting that athletes prefer to receive feedback via visual form, i.e. video feedback.

However, encouraging athletes to adopt more than one learning style whilst completing an activity has shown positive responses to learning (Bonk & Graham 2006). A number of players reported making notes during feedback and briefing sessions and reported that they are able to remember 'a lot of it' (Q11) as they are able 'to refer back to' (Q32) the information. Aiken et al. (1975) identified participants were able to demonstrate an increased recall ability when notes were made during and following a presentation. Lin & Bigenho (2011) conducted a similar study and discovered an increased memory recall when notes were taken either on paper or a computer. Therefore, encouraging players to make notes during feedback or briefing sessions may

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increase playing performance, as players are able to recall the information they have been told earlier in the training week.

Another way to increase memory recall is for athletes to take the responsibility of collecting and presenting information to other members of the team (Bampouras et al. 2012). Groom et al. (2011) suggested player involvement within a session or the delivery of a session has the ability for individuals to take responsibility for the information they pass on to fellow team mates. At one of the RU clubs, they sometimes 'break off into splinter groups where the back row [for example] will present to us [the other forwards]' (I4). The players also find discussion during the session useful as different ideas and solutions are debated (Q5). Although, having an active role in the presentation or discussion has to be monitored by the coach, due to talks becoming off topic and thus irrelevant for the whole team (Q35).

In addition, the opportunity for player input enables athletes to collect and present positional specific information, which is relevant to their needs. During the questionnaire, a number of players requested greater detailed positional specific feedback to assist in their own development (Q45&57). Francis & Jones (2012) also identified the need for positional specific data to be collected in order to inform feedback and future player developments. However, to date no research has identified a comprehensive list of positional specific indicators. The reasons behind this are due to the ever-changing demands of each position (James et al. 2005; Cunniffe et al. 2009) and the large range of

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anthropometric results for each position (Duthie et al. 2006). Therefore positional specific information must be collected by the players themselves as each player will want to look at different elements, which they believe will help improvements.

4.2. Preparing for a Match

Another emerging theme, which will also help individuals and teams improve, is the role of performance analysis within preparing for a competitive match. Previous studies have identified “players placed a heightened importance on pre match presentations relating to the forthcoming opposition as opposed to post match PA video sessions” (Mackenzie & Cushion 2012). The players within this study also suggested it important to be ‘able to analyse teams in preparation for games’ (Q66), specifically looking at ‘certain aspects and common trends of opponents’ (Q65). They believed ‘if you can go into a match more prepared than the opposition then surely you have a higher chance of winning’ (Q68). Also players placed an importance in understanding what individual players ‘do with the ball in hand’ (Q53) and ‘their main threats and their general strengths and weaknesses’ (Q73). The information, which is collected, can be utilised by the team to adjust their game plan and strategy accordingly, as discussed during interviews:

“It helps me to analyse the opposition, especially the lineouts, I will use it to see how they defend, in order for me to see which lineouts will work for us, and I will know how they will attack so we can alter our defence to suit their attack.” (see Appendix 4)

“The analysis is done in the week to ensure the players know what strategies they use, how you can position yourselves depending on what position you play, so one week we had a blind side winger and the blind

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side flanker dropped to add to our back three so that helped the team certainly.” (see Appendix 1)

Both of these examples highlight the real life scenarios where the utilisation of video and PA has assisted individuals and teams in developing an understanding of how the opposition play. Coaches, analysts and players will look at how teams ‘have been playing recently’ (Q4) in order to identify trends and ‘traits in their play’ (Q22). Sindik & Vidak (2008) believe players have an optimal course of action for any given event and if these actions are analysed a player’s outcomes can be predicted. Von Neumann & Morgenstern (1944) referred to this process as ‘game theory’, whereby the decisions individual’s chose during previous games, can be analysed and the information used to inform players of the probable decisions prior to undertaking a competitive game.

However, this collected information must be presented to players in a logical means to ensure individuals are able to recall and utilise the information to their advantage whilst competing (Parmigiani et al. 2009). To ensure information is absorbed into the long-term memory, Ranganath & Blumenfeld (2005) believe the method of repetition is the most effective process of ensuring information is retained. Topcu (2008) identified the use of repetition in learning, resulted in significantly better results. Therefore coaches should utilise the method of repetition whilst providing information to athletes during the preparation of matches. In order to suit individual’s learning preferences, a variety of techniques can be utilised. One player stated, ‘They [the coaches and analysts] do full analysis of the opposition and deliver the findings in portfolios and

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through video sessions' (Q73), thus providing information via verbal, visual and written means, ensuring repetition is achieved.

A number of players suggest they would like more information to be provided to them, to ensure they feel as prepared as possible. For example, a player (Q10) suggests he would like information on his opposite man enabling him to learn how to defend against him and his attributes. Whereas another player (Q38) states he would like information and video to be presented regarding 'breakdown opportunities'. However, players also suggest the information is sufficient, allowing him 'to prepare with accurate knowledge of the opposition' (Q6), ensuring players understand 'what is coming' (Q7). Therefore to ensure players remain to see PA as a useful tool, team briefing meetings should contain information, which is relevant to the whole team, such as game strategy. In addition to team briefing meetings, players should be encouraged to conduct PA in positional clusters or individually, as highlighted by two of the interviewed players:

"On an individual basis, maybe one or two days before a game I will have a look at the opposition on their attack and their defence... I look at the threats so which foot are they going to side step off and their strongest passing hand, so you know where to hand off or where to blitz, so get right up in their face as they are uncomfortable when passing off their right hand, knowing if they will kick and which foot, so they are things which I look at." (see Appendix 1)

"I will watch clips of the person opposite me, particularly based around the scrum, I will watch for particular trends or traits, little things I can pick up on which will help me during the game... things like how they set up, if they have one foot in front of the other which means they are only able to go in one way, if they move their foot on engagement then their shoulders and what they are doing with their bind, all sort of things like that." (see Appendix 3)

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As a result of the above findings, suggestions and evidence, a suggested match preparation schedule has been created (see Figure 4.1). According to O'Donoghue (2005) team and player trends become apparent after three matches, although more fixtures may be required if weather conditions or major team line-up changes have occurred. Thus a continuous cycle of coding and preparing opposition match footage, three weeks prior to the fixture, would create sufficient video evidence in order to highlight any specific trends and traits. Whilst the coding is being undertaken, the coaches and the analyst would be creating a written portfolio with illustrations to highlight the opposition's strengths and weaknesses, in addition to the team's selected game plan. Creating this portfolio enables players to continually remind themselves of the upcoming team, thus establishing an ideal learning environment for repetition (Ranganath & Blumenfeeld 2005).

Three Weeks Prior to Match	Two Weeks Prior to Match	Match Week					
		Monday	Tuesday	Wednesday	Thursday	Friday	Match Day
Coding of opposition footage and provide coaching team and players with a copy of the information			Team - Opposition Review		Team - Team's Game Plan		Team - Pre-Match Video
			Unit - Opposition Data Collection	Unit - Opposition Preview		Unit - Opposition Preview	
			Individual - Opposition Data Collection		Individual - Opposition Preview		Individual - Opposition Re-Cap
Create a written portfolio regarding the opposition			Team - Written Portfolio				

Figure 4.1: Match preparation schedule

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Following the completion of a team review on the Monday of the match week, the emphasis should turn to match preparation. Ideally, information should be presented to players over a longer time period (Young et al. 2009). However, research suggests individuals may become confused and unable to distinguish the difference between particular teams (Coker 2008). As a result, all information presented to the players in a match week should clearly focus on the upcoming match. During this week a mixture of team, unit and individual presentations should be conducted to enhance player's knowledge of the upcoming opponents. These range of presentations allow the coaches and players to provide their own opinion and take responsibility for certain aspects of the game. During the completion of the questionnaire, players mentioned that having an active role in the PA process was essential for their learning. This viewpoint was also identified by Bampouras et al. (2012), who identified a link between self-fulfilling prophecy (Goffman 1991) and having an active role in the process.

Players were also requesting additional information regarding individual players and their specific strengths and weaknesses. Allowing specific blocks of time for individuals to undertake PA, allows players to clearly understand what is expected to be completed during this time period. Additional resources may be created for players to complete, such as an individual strengths and weaknesses form. Also it is important to include injured players and individuals not selected within the match day squad, and thus additional responsibilities must be created and involved within all delivered team and unit presentations. If

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players feel isolated and not involved within the PA process, players will begin to develop negative perceptions towards its utilisation within RU and as a result will not utilise PA (Goffman 1991). However, if players feel involved within the PA process and encouraged to use it, players will incorporate PA into their training routine and gain the minimal advantages, which separate the winning team from the losing team (Goffman 1991).

4.3. Using Video for Reflection and Other Psychological Tools

An additional area in which players can utilise PA is to assist with their personal reflection, motivation and confidence. Tripp & Rich (2012) identified the use of video, whilst reflecting enables the individual to see themselves in practice, and individuals were able to recall prior events, highlighted on videos, whilst in action. Bower et al. (2011) discovered the use of video to support an individual's reflection enabled a deeper understanding of the previous events and also increased individual's confidence.

To date, the majority of the developed reflective models have an observation or reviewing component to their design (Kolb 1984). For example, Kolb's (1984) reflective model comprises of four cyclic stages (planning, doing, reviewing, learning). Whereas other models do not have a separate observation or reviewing component, but are comprised of several questions in which the use of video can underpin the whole cycle/model (Gibbs 1988). Therefore the use of video to assist with an individual's reflection can be incorporated into the above types of model.

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Bower et al. (2011) developed two specific four stage video reflection models for use within the educational sector. The first cyclic model starts with the actual performance/presentation being recorded and reflective notes are then made on how the individual felt. These comments are reviewed and additional comments made by peers or other members of staff, before the individual develops an action plan to advance their practice. Whereas the second four stage cyclic model relies on the individual performing an action followed by the writing of individual reflective thoughts. The individual then reflects upon other performances completed by their peers, and finally develops a strategy for their own personal development. When comparing the two models, they differ slightly in design and the use of video is critical for the model to work effectively. Although the model was developed for the educational sector, the model draws out a systematic process for personal reflection with the utilisation of video. This allows for continuous learning with support provided from peers, and thus can be transferred to other professional sectors, including sport.

The utilisation of video creates an objective visual record, which the individual can access at any point in the future. The video enables the individual to remember 100% of the event, allowing the individual to conduct deeper meaningful reflection, as they are able to recall the whole event. Within a sporting context, the use of video allows players to reflect on areas that have been forgotten, and see how they can improve their performance within future games (Q48). For example, 'when I [a player] have made a decision during the

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game I [a player] can check what other options were available and if I [a player] had chosen the best one’.

An additional area where video can support an individual’s reflection, is highlighting areas of strength. Stoeber et al. (2007) identified that player’s focus on the negatives of a performance and thus cloud their judgement on how they performed. Additionally, Smith (2006) suggests if players only focus on the negative aspects of performance, psychological issues may arise, particularly related to the individual’s motivation. Therefore, players can utilise the video to assist in highlighting their strengths. For example, a player states video ‘allows me to see when I am doing things correctly. This helps my confidence, and thus aids my performance’ (Q5). Bower et al. (2011) identified the use of video during reflection increases the individual’s levels of confidence, which enabled a more effective performance, thus supporting the player’s above comments.

When coaches utilise video to provide feedback, athlete’s motivation and confidence can be affected by what they see and what is communicated to them (Crook et al. 2012). Krenn et al. (2013) identified athletes raised the difficulty level of tasks after receiving positive feedback and thus improved performances when placed under pressure. However, if positive performances are always shown, Høigaard et al. (2006) suggest players will begin to believe they do not need to improve in any other area and start to be idle in training and matches. Whereas, Groom & Cushion (2005: p.45) believe when coaching “players a minimum of a balance of a positive example followed by every

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negative example is suggested (1:1 ratio)". Viciano et al. (2007) agrees with Groom & Cushion (2005), discovering players who receive both positive and negative feedback demonstrate lower levels of learning-oriented motivational climate, lower levels of boredom and higher scores of enjoyment. However, if a team or player is particularly struggling with confidence and motivation, a greater quantity of positive feedback should be provided to the athlete (2:1 ratio) (Groom & Cushion 2005).

It is the role of the coach to develop an appropriate coach-player relationship whereby the coach understands the athlete and the athlete respects the coaches' comments. For example, a player states 'they would look through the game if I asked them to and would give honest feedback to me which has helped massively'. However if the coach-athlete relationship had not been established, the player's acceptance of the feedback would be considerably reduced (Alfino 2009). For example, the participant in Nelson et al.'s (2011) study believed one of the coaches was lacklustre in his approach and took very little interest in the players, and as a result took very little interest in the information he provided. Although, if the coach has taken time to understand the player's needs and requirements, athletes are more likely to take into consideration the comments made by their coaches (Nelson et al. 2011). If the coach has taken time to develop this relationship, a mutual respect would have been developed whereby players are comfortable to ask questions and discuss certain scenarios where the coach has a different view to the player. Nelson et al.'s (2011: p.8) participant believed his respect for the coach was based upon

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the coach “being passionate about their job, committed to their athletes’ ongoing development, demonstrating a strong desire to win and having an authoritative knowledge base and social presence”. The players within both teams suggested they were able to start conversations with the analysts and coaches, and that it was an important component for them to take into consideration when they were discussing a performance and/or receiving feedback (Q36 & Q74).

4.4. Player Suggestions for Improvements

As PA is a relatively new sport and exercise discipline, there is limited guidance regarding how it is best used in sport. Consequently, input and insight from the individual’s who start and end the PA process is always useful. However, for coaches and analysts to take into consideration the views of their athletes, an environment must be created where mutual respect and trust exists for each individual involved within the process. The athlete is the start and end of the PA process and without their support and guidance the process would not be complete. When the athletes were discussing areas for future improvements, within their current PA programme, two sub-themes emerged: (1) accessibility to footage and (2) feedback quality.

4.4.1. Accessibility to Footage and Information

With the advancements with modern technology, individuals are able to access video and other multimedia via the Internet on phones, tablets or laptops (Ostaszewski & Reid 2010). However, athletes at the two clubs were unable to

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access footage on any personal device whether they are in the vicinity of the club or at home. The players wanted a system where they could log on and “access the footage from anywhere” (Q32). Allowing players to access footage at any given time enables them to enhance the number of learning opportunities they are provided within the match week (Shea et al. 2000).

Within an educational sector, the use of e-learning has become an increasingly common support tool to aid traditional teaching methods (Arroyo-Morales et al. 2013). E-learning relies on the utilisation of multimedia (videos and online documents) to support an individual's learning (Garrison 2011). Feng et al. (2013) proposed e-learning as an effective method for enhancing an individual's cognitive ability regarding certain set tasks. However, teachers are unable to monitor the time individuals spend completing the work. New e-learning systems have integrated monitoring systems, which produce statistics based upon individual's activity. Although students can 'out smart' the system by loading the page, which starts the time spent statistic, and then begin working on another unrelated webpage (Hirumi 2002).

Although the above limitation must be acknowledged, the use of e-learning enables learners to access the information at any given time and in any given location, thus enabling learners to learn in their optimal learning environment (Thiessen & Ambrock 2008). Cheng et al. (2012) identified the use of e-learning within the learners optimal learning environment promoted learning and an increased motivation when compared to learning in a restricted environment.

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Therefore, if the clubs are able to design appropriate e-learning materials and video, the above research has identified that an individual's knowledge will increase in addition to their willingness to learn the information.

As a result, documents and video can be created which can be utilised to assist with the preparation of the team before a game, during the actual match and following the game for individuals to reflect on their performance. However, it is important for a club to understand and accept the cost of setting up this service, in addition to the usability and uptake of the service by the players, in order to make it a financially viable system.

4.4.2. Quality of Feedback and Information

In addition to the accessibility of footage, players also requested a greater number of individual feedback sessions where they would receive in depth detailed feedback related to aspects of their game in need of improvement. For example, a number of players requested 'more individual review on certain position specific skills' (Q10) and 'more individual feedback' (Q11). Although the players have the occasional individual feedback session, they requested a greater number of 'one to ones with clips' (Q44). The coaches provided immediate feedback during exercises or training, however making time during the week to sit down with a player can be a significantly valuable tool in providing information but also developing the coach-athlete relationship.

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Findings from the player interviews and questionnaires suggested that team meetings needed to be 'shorter with more valuable points' (Q8) and 'more relevant' (Q19) information provided. Bunce et al. (2010) suggest that individuals can maintain focus on a task for a maximum of 20 minutes. Within this time period a maximum of nine key points are required to ensure information can be stored and later transferred to the long term memory from the short term memory (Alvarez & Cavanagh 2004). If coaches are able to deliver the required information within this time period, with support from additional written/visual information, players have been provided with an optimum learning environment and learning load, supporting the retention of information.

4.5. Strengths of the Study

The study was the first RU research project to investigate the thoughts and opinions of RU players towards the daily use of PA to enhance and support player development. There are a number of strengths to this research, firstly the study utilised two complete RU team from within Great Britain. Previous studies, which have investigated the perceptions of players towards PA, have focused on one group of athletes within a particular team and have therefore only provided a limited insight into the perceptions of players (Groom & Cushion 2005).

Secondly, the research has combined two qualitative data collection methods to gain a true representation of the players opinions towards the sports science

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discipline. Player perception research to date has utilised either questionnaires or interviews as separate tools. However, combining these two data collection methods has enabled information to be collected regarding the players perceptions in addition to the ways in which PA has aided their developments as players.

Thirdly, at the start of each RU season a large number of players leave and new players are introduced into the team. Therefore by collecting the research towards the end of the season players had the opportunity to build their own thoughts and opinions regarding the PA process at the club, whereas if the study had have been conducted during August, players would have only been at the club for a maximum of two months and therefore the athletes would have been unable to provide a true and realistic account.

Finally, the information which has been collected as a result of this study has provided coaches and the analysis department at the two clubs with an in depth insight into the views and opinions that the players hold towards PA. The feedback provided by players has identified ways in which the service can be improved further, enabling the relevant individuals to make the necessary amendments to the process, ensuring the players needs are put first.

4.6. Limitations of the Study

Although the study has outlined player's perceptions towards PA in RU, a number of limitations have been identified. Firstly, the design of the study was a

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descriptive case study design, therefore the findings of the study only highlight the thoughts and opinions of the players utilised from the two RU clubs and as a result do not generalise all RU players perceptions of PA. However, the findings do provide an insight into how RU players view PA as a tool to assist their performance.

Secondly, of the two RU clubs, which were utilised within the study, all players' information was combined, irrelevant of their current or highest level of performance. For example, the information provided by a player within the club's academy system and information from players within the first team were combined and analysed with the same value within the study. Previous studies have identified coaches can play an influencing role on how players perceive PA, although within the RU clubs the academy coaches also work with the first team players and the first team coaches work with the academy players. For these reasons it is a factor which could not be controlled or evaluated within the study.

Finally, the player interview was not used to its full effect, as players were only able to spend five minutes answering questions following the completion of the questionnaire. Therefore, either a larger number of interviews should have been conducted in order to gain real-life examples from the players or the interviews should have been completed at another time during the athletes training week in order to provide enough time for the interview to take place. The pilot study involved one athlete completing an interview on a different day to when the

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group of athletes completed the questionnaire and as a result this issue was not made apparent at that stage.

4.7. Future Research Areas

The study has provided an insight into the perceptions of players towards PA, however future research is required in order to gain a comprehensive understanding of player perceptions towards PA. Firstly, a larger number of players should complete the questionnaire and interview. By increasing the number of participants, coaches and analysts can gain a greater understanding of the perceptions of RU players and therefore understand how to improve the support service from the view point of the players.

In addition to the players completing questionnaires and interviews, it would be useful to gain an understanding of how the coaches, support staff and performance analyst's view PA and the value it holds in helping develop players needs. Bampouras et al. (2012) interviewed an analyst, a coach and a player to gain an understanding of their opinions. However, within their study all three individuals involved were from different sports and were unconnected. Therefore, by completing an inter-disciplinary research project, a holistic account of the individual's experiences towards PA can be gathered.

Finally, the creation of a quantitative questionnaire to evaluate the perceptions of players, using a likert scale, could be created. Creating a quantitative questionnaire will allow players to complete the questionnaire in a shorter time

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period, although individuals will be unable to input their own opinions and real life examples. In response, a semi-structured interview could also be completed to support the questionnaire data and gain further insight into the personal opinions and views held by the players and staff.

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5.0. Conclusion

In conclusion, this study, which is the first to investigate the perceptions of RU players towards PA, identifies players hold PA as a beneficial and important tool for their on-going development and performance preparation. A player summarises his views towards PA, which is similar to those shared by all participants within the study:

“I think it is useful because the camera doesn’t lie. You can come away from the game thinking certain things went differently in the game to how they actually happened on the video. It highlights every little detail and if it is used effectively to help progress you in the right way then I think it’s a beneficial tool.” (see Appendix 4.1).

The above statement echoes previous findings in PA perception research, which were undertaken by Groom & Cushion (2005), Nelson et al. (2011) and Bampouras et al. (2012). Although within this study four different themes emerged; how video can be used for player development, match preparation, player reflection and other psychological tools and finally, suggestions for future improvements for PA within RU. In addition, players highlight the importance of developing an effective athlete-coach relationship where each individual trusts one another and is willing to consider the other individuals views. The importance of this can be highlighted by theories surrounding trust (Hoy & Tschannen-Moran 1999) and exchange (Blau 1986).

RU coaches and practitioners can utilise the findings of this study to support and strengthen their own teams PA programme. Coaches need to find

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alternative delivery methods, which cater for individual learning styles and also ensure individuals remain motivated towards the use of PA. In addition, coaches should encourage the active involvement of athletes during sessions and ensure that athletes take personal responsibility for conducting their own analysis on their performance and the performances of others in order to enhance their knowledge of the game.

In summary, the research findings identified within this study can be utilised to strength the on-going knowledge regarding how players perceive PA. Although, the researcher acknowledges and welcomes additional research in this area, in order to gain a comprehensive understanding of player's opinion towards this relatively new sport and exercise discipline in RU and other sports.

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7.0. Appendices

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7.1. Appendix 3.1 – Ethics Checklist

This form is intended as an initial checklist for students/members of staff undertaking a research project. Ethical approval must be obtained prior to starting research with human subjects, animals, human tissue and literary or artistic works with human or animal subjects.

Researcher:	John Francis
Email:	j.francis@worc.ac.uk
Institute/Service/Dept:	Sport
Status:	PG Taught Student
Supervisor (if PG student):	Gareth Jones
Project Title:	Player perceptions in Rugby Union

Checklist

	Yes	No
1. Does the study involve participants who are particularly vulnerable or unable to give informed consent? (e.g. children, people with learning disabilities, your own students/employees)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited? (e.g. students at school, members of self-help group, residents of nursing home)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Will the study involve discussion of sensitive topics (e.g. sexual activity, drug use, abuse, discrimination)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Is pain or discomfort likely to result from the study?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Could the study induce psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (e.g. covert observation of people in non-public places)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Does the study involve deception?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Will the study require the gathering of information about unlawful activity?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. Does the research involve access to, or the collection of, sensitive/confidential data from other organisations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Will financial inducements be offered beyond reasonable expenses and/or compensation for time?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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11. Will invasive procedures be part of the research (e.g. blood sampling, temperature probes)?
12. Will the study involve prolonged, high intensity or repetitive testing?
13. Does the study involve testing of animals?
14. Does the study involve NHS patients, staff or premises?

If the answers to any of these questions change during the course of your research, you must alert your Supervisor or Ethics Representative immediately.

Signatures

Researcher:



Date: 14/02/13

Supervisor
applicable)¹:

(if



Date: 22/02/13

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7.2. Appendix 3.2 – Ethics Form

I. Applicant details:

Name of Student: John Francis

Title of Proposed Project: The perceptions of rugby union players towards performance analysis

Course Undertaken: Masters in Sports Coaching

Email Address: fraj2_09@uni.worc.ac.uk

Supervisor: Gareth Jones

II. Research Project:

Aim: to identify the perceptions elite level rugby union players currently have regarding the use of performance analysis in improving their own playing performance and in highlighting the strengths and weaknesses of upcoming opponents.

Method: Approximately 250 male and female elite rugby union players (18+ year olds) will be contacted to participate, following written permission from the head coach. Players will only be utilised if they have had regular access to performance analysis support within the previous month, on a minimum of four separate occasions. A semi-structured questionnaire will be developed and semi-structured interviews will be conducted. Five question themes will be developed: general performance analysis use, individual analysis, team analysis, opposition analysis and training/support. Thematic content analysis will be conducted on all open-ended questionnaire and interview responses. Descriptive analysis will be conducted on all demographic variables and closed-ended responses.

Participant Information Sheet and Informed Consent Form: See End of Form

III. Ethics:

Please answer clearly and in detail each of the following questions:

Who are the participants? How will consent be gained? Do they belong to a group unable to give informed consent?

Approximately 250 male and female elite rugby union players will be contacted to participate, following written permission from the head coach for each club or team. Four rugby union clubs will be contacted as previous links between the club and myself already exist.

How will the participants be recruited?

The study will involve the cooperation of a gatekeeper (Rugby club head coach or director of rugby) for initial access to groups of participants. Participants will be recruited following a meeting with the coach/director of rugby through the following means: Volunteers will be asked to participate from the professional

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rugby clubs where the researcher has existing links. The meeting with the coach will consider the project aims and objectives. Following written consent, a presentation will then be delivered to all players and the questionnaires will be handed out to the players. Following the presentation, two players will be randomly selected from a squad list to undertake a semi-structured interview.

How will you explain the purpose and nature of your research to prospective participants?

A presentation outlining the aims and benefits of the study will be delivered to the participants.

Does the procedure involve any possible distress, discomfort or harm to participants?

No distress, discomfort or harm will be caused to the participants as no sensitive topics, invasive procedures or psychological stresses will be discussed.

How will you provide opportunities for potential participants to exercise their right not to participate?

Participants answering the questionnaire will have the right not to fill out the information. Individuals selected for the individual have the option to withdraw from the study at any time. If this occurs, an additional individual will be randomly selected from the squad list.

Does the research involve contact with any other organisation or group (e.g. schools, clubs, etc.)?

The project will involve contact with the rugby clubs, coaches, players and performance analysis departments.

Will the research be undertaken outside the University of Worcester Campus? If 'Yes', have you made yourself aware of local provisions for Health and Safety in the research location? List them here and give as much detail as possible.

The research will be undertaken at the players rugby clubs. The presentation and interview will be conducted in the teams meeting room. The following health and safety procedures will have to be considered:

Risk Assessment

Fire Procedures

Manual Handling of Equipment

Are there any specific risks to the researcher greater than those encountered in normal day-to-day life? (Consider all possible causes of risk carefully, including social, physical and psychological.) If 'Not', why. If 'Yes', list them here and explain what you will do to minimize this risk.

Elite Rugby Union Players Perceptions Towards Performance Analysis

There are no specific risks during the data collection of the study. The data collection procedures include the distribution of questionnaires and conducting several individual interviews.

Please indicate what particular qualifications, vetting (e.g., CRB) or training are needed to administer the tests or sessions, and if so, whether the supervisor or student is appropriately qualified or external assistance is needed.

I will be working with over 18's who are able to give full consent. Having completed an undergraduate research methods module and dissertation in addition to a post graduate module in research methods I believe I have gained experience in conducting semi-structured interviews. With regards to the questionnaire, I have attended a Doctor of Philosophy training session specialising in questionnaire design during October 2012.

If the research involves research assistants or other personnel to carry out specific research tasks in your research, how will you ensure that they comply with the Institute's Ethics procedures?

No research assistants or other personnel will be required during the data collection process. However, additional personnel will conduct triangulation of coded data to ensure trustworthiness of the information.

How will you address anonymity and confidentiality issues? Give as much detail as possible.

The questionnaires will remain anonymous, however each coach will be provided with data upon request. With regards to the interview, limited demographic data will be utilised within the study, to ensure the player remains anonymous.

How will you provide for security of the data during and after the study? Give as much detail as possible.

Questionnaires will be stored in a lockable storage container and interview recordings will be copied to a DVD. All the collected data will be stored in a lockable container. All information will be destroyed within three months of the completion of the study.

13. Please describe any other procedures relevant to complying with the University Ethics or BASES code of conduct, indicated in the lab manual in the E- admin website.

I will utilise a gatekeeper for the study, the director of rugby or head coach, to gain access into the club. However, the study will remain optional for all players and the right to withdraw will be highlighted to all participants.


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Declarations by Chief Investigator

The information contained herein is, to the best of my knowledge and belief, accurate.

I have attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my obligations and the rights of the participants.

Note to student: Signing this form certifies that you agree to carry out the research in the exact manner specified above. If you wish to deviate from the above-outlined procedures at any time, you should discuss this with your supervisor, and, if he/she thinks it necessary, you should re-submit both the UW Ethics Checklist and the ISES Research Ethics form.

Student's name	Signature	Date
John Francis		16/02/13

Declaration by supervisor:

() The student has the skills to carry out the research or appropriate assistance has been arranged (e.g., a copy of the lab competency form has been seen).

() I have seen the participant informed consent and I consider it appropriate

() The procedures for recruitment are appropriate

A copy of this proposal is being referred to the Institute for further consideration.

() Yes () No

Note to Supervisor: Do not sign this form unless you have seen all the above-mentioned documents and all boxes have been ticked. In case the proposal is referred to the Institute for review please send all relevant documentation to the ISES Ethics coordinator.

Supervisor's name	Signature	Date
Gareth Jones		22/02/13

Elite Rugby Union Players Perceptions Towards Performance Analysis

7.3. Appendix 3.3 – Informed Consent – Interview

Project title: Perceptions of performance analysis within rugby union.

Thank you for showing an interest in this project. Please read all the information in this leaflet carefully. Then please consider whether you wish to take part in this project. Participation in this study is completely voluntary. If you decide to take part, you will be asked to sign this form. If you decide that you do not wish to participate, then please appropriately discard this leaflet or hand it back to the researcher. Regardless of your decision, I thank you for your time.

What are the aims of the project?

The main aims of the project are:

To identify the perceptions elite level rugby union currently have regarding the use of performance analysis in improving their own playing performance and in highlighting the strengths and weaknesses of upcoming opponents.

What will you be asked to do?

Procedures

If you agree to take part, you will be asked to complete a self-administered questionnaire and potentially take part in a small interview. Questionnaire will take approximately 20 minutes to complete and then potentially take part in a the interview, which will take a maximum of 30 minutes of your time.

Risks and discomfort

The only risk that you may face by taking part in this project is psychological as some of the topics require you to reflect on previous experiences. If you experience any degree of discomfort at any stage of the completion of the questionnaire or the interview then you can withdraw from the study without any future consequence.

Safety

All collected data will be stored within a lockable draw and/or a password protected hard drive. As the chief researcher I must consider your social and psychological wellbeing. If you feel that these are at risk and you wish to withdraw from the study then you can do that anytime without explaining your reasons to the chief investigator (John Francis).

Injury

It is unlikely that you would get physically injured during this study as it does not require you to do anything physical. However if you feel uncomfortable with completing the questionnaire or being part of the interview you can withdraw anytime without explaining your reasons.

Benefits

The benefits that you will gain by taking part in this study are:

An understanding of why and how people get their perceptions about performance analysis.

Elite Rugby Union Players Perceptions Towards Performance Analysis

A potential improvement in the delivery of performance analysis at your current club. Also, by taking part, you will help us to increase knowledge of the area being studied.

Can I withdraw from this study?

You can change your mind and decide not to take part any time. If you decide to withdraw from the study, you do not have to give any reason for your decision, and you will not be disadvantaged in any way.

What information will be collected, and how will it be used?

The data collected from the questionnaires and interviews will be predominantly qualitative in nature (your thoughts and feelings) and will be compared to other views. These data will then be analysed, interpreted and be written up as part of a masters level dissertation.

The findings of this project may be published, but the information will not be linked to any specific person. Your anonymity is carefully guarded and I promise full confidentiality. A copy of the results and/or your interview transcript may be given to you upon request or the head coach of the club. The raw data will be discarded after the completion of studies.

Should you require further information please do not hesitate to contact the Chief Investigator, (John Francis), at any of the testing sessions or via e-mail (j.francis@worc.ac.uk), or (Gareth Jones), academic supervisor, at g.jones@worc.ac.uk.]

Statement by participant

I have volunteered to take part in this project
I know I can withdraw at any time without being disadvantaged
I am satisfied that the results will be stored securely
I know that the results may be published, but they will not be linked to me
I am aware of any possible risks and discomfort
I agree to inform the researcher immediately if I feel uncomfortable
I have had the chance to ask questions regarding the study
I know that I will not receive any money for taking part

If you have concerns about any aspect of this study you should ask to speak to the researcher(s) who will do their best to answer your questions. However, if you have further concerns and wish to complain formally about any aspect of or about the way you have been treated during the study, you may contact Dr John-Paul Wilson on (01905) 54 2196.

I have read and understood this form it. I agree to take part in the project entitled Perceptions of performance analysis within rugby union.

Signed (Participant):

Date:

Elite Rugby Union Players Perceptions Towards Performance Analysis

Elite Rugby Union Players Perceptions Towards Performance Analysis

7.4. Appendix 3.4 – Informed Consent - Questionnaire

Please read all the information on this page carefully prior to answering any questions. Participation in this study is completely voluntary and no incentives will be provided.

The study aims to identify the perceptions of elite level rugby union players towards the use of performance analysis in improving their own playing performance and in highlighting the strengths and weaknesses of upcoming opponents regarding teams and individuals.

The information you provide within the questionnaire will remain confidential between yourself and the researcher. The questionnaires will be stored in a lockable storage container and once data has been collected, the questionnaires will be destroyed. The data will then be analysed, interpreted and be written up as part of a dissertation. The findings of this project may be published, but the information will not be linked to any specific person. Your anonymity is carefully guarded and I promise full confidentiality. A copy of the results may be given to you or the coach upon request. The raw data will be discarded after the completion of studies.

The results of the study will be utilised by coaches and analyst to alter future practice ensuring your views as a player are considered when planning any performance analysis sessions. Therefore, this is an opportunity to voice your opinions regarding how performance analysis is utilised within your current team or club. Also, by taking part, you will help to increase knowledge regarding the player's attitudes and thoughts surrounding performance analysis.

Should you require further information please do not hesitate to contact the Chief Investigator, (John Francis), at any of the testing sessions or via e-mail (j.francis@worc.ac.uk), or (Gareth Jones), academic supervisor, at g.jones@worc.ac.uk.

If you have concerns about any aspect of this study you should ask to speak to the researcher(s) who will do their best to answer your questions. However, if you have further concerns and wish to complain formally about any aspect of or about the way you have been treated during the study, you may contact Dr John-Paul Wilson on (01905) 54 2196.

Elite Rugby Union Players Perceptions Towards Performance Analysis

7.5. Appendix 3.5 – Pilot Questionnaire

Age:..... Gender:..... Position:

Level of performance (please circle): International 1stXV

Academy

Code (please circle): 15-a-side Sevens

General Questions

1. Briefly outline your weekly interactions with performance analysis?
2. Do you think the performance analysis sessions are well structured and presented in a professional manner?
3. Would you change the format and length of the performance analysis sessions?
4. How are the sessions delivered too you? And do you think this is an effective method?
5. How would you like the performance analysis sessions to be delivered in the future?

Training and support

6. When you first started with the club/team, where you expected to be able to utilise the available software or were you given training?
7. If you have received training, how was this delivered and do you think this was suitable for your needs? (If no training provided skip to Q7)
8. Can the coaches or support staff do anything to support your needs as a player regarding the use of performance analysis?

Individual Performance Analysis

9. When receiving individual feedback, do the coaches use performance analysis to deliver their message? And do you find it an effective method?
10. Do you focus on the positive aspects of your performance (tries and big tackles) or the negative elements (handling errors or missed tackles)?
11. How would you like to receive your individual feedback in the future?

Team Performance Analysis

12. When receiving a debrief from a previous performance, do the coaches run a single unit session or unit specific debriefs?
13. Are you required to complete any work to assist in evaluating the teams performance?
14. Do you look forward to watching your mistakes in front of all the coaching team and other players?

Elite Rugby Union Players Perceptions Towards Performance Analysis

Opposition

15. How is performance analysis used to prepare you as a player for upcoming opponents?
16. Do you find it a useful process to identify a teams strengths and weaknesses?
17. Of the information provided in the week, how much do you remember and are able to utilise in the match?

Closing Questions

18. Do the coaches make you feel involved in the preparation of presentations, information and feedback or do you get told everything?
19. Why do you see performance analysis as a tool to assist and benefit your performance or as a tool you are afraid of and do not see the importance?
20. If you could change one thing about the club/team use performance analysis what would it be?
21. Additional Comments

Elite Rugby Union Players Perceptions Towards Performance Analysis

7.6. Appendix 3.6 – Pilot Interview Questions

General

1. What are your weekly interactions with performance analysis?
 - Receiving feedback and looking at opponents?
 - Length of each performance analysis session?
 - Previous completed performance in comparison to upcoming performances?
 - Own performance evaluated or just the teams performance?
 - Access to footage do you have? Time periods?

Previous performances

2. Do you like how the coaches utilise performance to evaluate your own performance?
 - Techniques do your coaches utilise to deliver this feedback?
 - Active role in evaluating your own performance or is it coach led?
 - Analysis completed as a whole or in to units?
 - Different ways of delivering areas identified in the review?

Upcoming opposition performances

3. How is performance analysis utilised to prepare you as a player for upcoming opponents?
 - Active role in identifying potential strengths, weaknesses, opportunities and threats?
 - Are the debrief and briefing session combined or separate?
 - Level of memory recall?
 - Learning style?
 - Main thing you remember when watching footage on opponents and why?

Conclusion

4. Do you see performance analysis as a tool to assist performance or is it a tool players are afraid of?

Elite Rugby Union Players Perceptions Towards Performance Analysis

7.7. Appendix 3.7 – Pilot Interview Informed Consent Form

Project title: Elite rugby union players perceptions towards performance analysis.

Thank you for showing an interest in this project. Please read all the information in this leaflet carefully. Then please consider whether you wish to take part in this project. Participation in this study is completely voluntary. If you decide to take part, you will be asked to sign this form. If you decide that you do not wish to participate, then please appropriately discard this leaflet or hand it back to the researcher. Regardless of your decision, I thank you for your time.

What are the aims of the project?

The main aims of the project are:

To identify the perceptions elite level rugby union currently have regarding the use of performance analysis in improving their own playing performance and in highlighting the strengths and weaknesses of upcoming opponents.

What will you be asked to do?

Procedures

If you agree to take part, you will be asked take part in an interview, which will take a maximum of 30 minutes of your time.

Risks and discomfort

The only risk that you may face by taking part in this project is psychological, as some of the topics require you to reflect on previous experiences. If you experience any degree of discomfort at any stage of the completion of the questionnaire or the interview then you can withdraw from the study without any future consequence.

Safety

All collected data will be stored within a lockable draw and/or a password protected hard drive. As the chief researcher I must consider your social and psychological wellbeing. If you feel that these are at risk and you wish to withdraw from the study then you can do that anytime without explaining your reasons to the chief investigator (John Francis).

Injury

It is unlikely that you would get physically injured during this study as it does not require you to do anything physical. However if you feel uncomfortable with completing the questionnaire or being part of the interview you can withdraw anytime without explaining your reasons.

Benefits

The benefits that you will gain by taking part in this study are:

Elite Rugby Union Players Perceptions Towards Performance Analysis

An understanding of why and how people get their perceptions about performance analysis.

A potential improvement in the delivery of performance analysis at your current club. Also, by taking part, you will help us to increase knowledge of the area being studied.

Can I withdraw from this study?

You can change your mind and decide not to take part any time. If you decide to withdraw from the study, you do not have to give any reason for your decision, and you will not be disadvantaged in any way.

What information will be collected, and how will it be used?

The data collected from the interviews will be qualitative in nature (your thoughts and feelings) and will be compared to other views. These data will then be analysed, interpreted and be written up as part of a research handling assignment.

The findings of this project may be published, but the information will not be linked to any specific person. Your anonymity is carefully guarded and I promise full confidentiality. A copy of the results and/or your interview transcript may be given to you upon request. The raw data will be discarded after the completion of studies. Should you require further information please do not hesitate to contact the Chief Investigator, John Francis, at any of the testing sessions or via e-mail (j.francis@worc.ac.uk), or Gareth Jones, supervisor, at g.jones@worc.ac.uk.]

Statement by participant

I have volunteered to take part in this project

I know I can withdraw at any time without being disadvantaged

I am satisfied that the results will be stored securely

I know that the results may be published, but they will not be linked to me

I am aware of any possible risks and discomfort

I agree to inform the researcher immediately if I feel uncomfortable

I have had the chance to ask questions regarding the study

I know that I will not receive any money for taking part

If you have concerns about any aspect of this study you should ask to speak to the researcher(s) who will do their best to answer your questions. However, if you have further concerns and wish to complain formally about any aspect of or about the way you have been treated during the study, you may contact Dr John-Paul Wilson on (01905) 54 2196.

I have read and understood this form it. I agree to take part in the project entitled Perceptions of performance analysis within rugby union.

Signed (Participant):

Date:

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7.8. Appendix 3.8 – Pilot Questionnaire Transcript

Background

Can you briefly outline your playing history?

- I started playing rugby union when I was nine years old, at a local club on a Sunday. I joined a secondary school, at the age of 11, and that is really where my rugby started as it were. I started receiving proper coaching and playing every Wednesday and Saturday. I started playing 1st XV rugby at the age of 15, so I had three years in the first team. During my final year of school I was asked to play in a couple of 2nd XV games for a professional rugby club and from that I was offered an academy contract for the following season. I have then progressed through the ranks at the club from playing in the academy to becoming a regular 1st XV player.

What do you actually think performance analysis is?

- Performance analysis for me is the use of video footage to break down specific parts of your game to evaluate your accuracy and efficiency in certain areas and provide you with a more detailed view on your performance as a whole.

When did performance analysis start in your career?

- That only started when I began playing in the academy at the professional rugby club, which was 2005/2006. That was the first time I had been introduced to it, I had a basic understanding of what it involved but I had never used it for my own benefit in order to improve my performance.

From when you started at the club how has your definition of performance analysis changed?

- It has maybe slightly changed, when I first started I may have been slightly naïve as to how much sitting down and looking at the footage can help, not only in your own performance but also looking ahead at opposition footage, which I rarely did on an individual basis we did it as a team, when I first started. Now as I think now I put a lot more emphasis to sit down for 20 minutes or 30 minutes and go through footage looking for specific things for my own game but also regarding my opponents.

When you first started at the club, were you given any training on performance analysis?

- When I first joined the club it was more a case of the coaches arranging one on one meetings following a game. At that stage there was not much emphasis on myself, I did not go and use it, it was more the coaches then I would sit down and go through my footage with me and point out coaching points that they wanted to put across. That was how it worked in the early stages for me.

Do you find performance analysis useful in your performance? Is it a useful tool in helping you improve your performance?

- I think when used in the right way statistics are incredibly valuable, I think that when statistics are kind of black and white on a piece of paper they do not necessarily take everything into account. With the statistics that we get here I tend to sort of choose the ones, which I feel are relevant to me and ignore others.

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So which statistics do you personally focus upon?

- Things like kicking and the pass completion, which dictates how accurate my passing is, obviously penalties conceded, penalties gained, turnovers conceded, basically any errors and the defensive contributions, I feel are relevant.

General

What are your weekly interactions with performance analysis?

- So first training day back um ill sit down and review my game. Err sorry even before then we get given our statistics. So the day after a game we get given a breakdown of our individual completed actions such as my tackle statistics.
- All that kind of thing is sent to me so I can have a look, then the first training day after a game I come in and go over my individual game, I will look at important aspects of my game such as counter attack or our phase play attack. Then I guess it is a case of undertaking a video analysis session with the head coach, analyst and the backroom staff, which they have prepared over the weekend. Then I will go to the analysis room and go over a couple more bits and maybe some training footage, looking at any important things which are flagged up.

Do you have team sessions or unit sessions or is it a mixture?

- Yes we have both.

What do you think to the length of these sessions?

- It depends on the situation. If you have got something specific which needs working on then obviously a session can be longer. I think the best sessions are shorter in time periods but the intensity is high. For me you can achieve as much in a 40-minute session as you can in an hour and a half session, but if you can condense the workload and the session is meticulously planned, moving smoothly between one thing and another, and things are easily explained so you can get on and crack on with it.

Do you find you are able to take more information away from those sessions which are more professionally planned compared to a session which is thrown together?

- Without a doubt I think err, if you come out and everything is organised for you and you move from one topic to the next and the less time you have in-between topics waiting for things to be set up, otherwise you lose concentration and your mentality is affected, then it is difficult to get back into that session.

Footage Availability

Regarding footage, are you only able to access it at the club or are you able to view videos at home? What is the current situation?

- Currently, we only really have the ability to access the footage at the club, I know that obviously you can take away footage on hard drives or borrow one of the laptops if you want to, as in terms of getting on the network [where all the games are stored], that is just here at the club.

Would you find it useful to access the network from home?

- Yes I would find it useful.

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Individual

Do you like how coaches utilise performance analysis to evaluate your own previous performance?

- It can vary, in an ideal world they like to sit down with you on a one on one basis and tend to go through your game, that will be going through your match footage in comparison to your match statistics. With someone like our defence coach, he focuses more on the tackle statistics but that is quite an objective thing. But you also have the unit debrief, where again you go over footage. The coaches do use statistics such as territory, possession and conversion rates as it were how long do you play in a specific zone such as the time spent in the 22nd and the percentage of points gained as the outcome.

What techniques do your coaches utilise to deliver feedback? Do they sit down, show you videos or walk you through and provide demonstrations?

- It is, it is more visual stuff so we will sit down and look at footage either on a one on one basis or as a group with the odd PowerPoint slide with a diagram on it with the running lines on it or an integrated video.

Do you find that useful method or would you prefer it in a different style?

- I think just having a mix is the best way so that things are kept as fresh as possible.

Can the coaches and support staff do anything to assist your needs regarding performance analysis?

- I think it is important for coaches to look at your individual footage and I think quite often when they are points they want to make to you and put across to you about your game and areas in which you need to improve upon. I think it is important to have footage to back things up, I got a lot of benefit in my early career from a coach sitting me down and going through aspects of my game step by step.

So would you think receiving individual feedback is more important for beginners or experts?

- I think it is always important regardless of what stage in your career, I do not think you are never too old to stop analysing your own performance and looking to make improvements.

Do you find the current feedback process useful?

- I am relatively happy with the way we do it. I think the only thing which I may benefit from is, but then this is something that I can chase myself is sitting down on a one on one basis going through your footage and raising any issues you do have.

Have you ever used performance analysis to analyse a specific skill important for your position?

- Yes, the first thing, which comes to mind, is collecting high balls. So I have watched a few other guys in the league and internationals who I believe are good in the air when placed under pressure. I looked at their technique, how they approached the ball and I guess that is from using performance analysis to assist my skill development.

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So have you done that off your own back or was it coach led?

- No I have done that off my own back.

Team

When you have team or unit debriefs can you briefly outline what is included?

- For example the defence meeting we had this morning, so the defence coach tends to review the previous game we have played from a defence perspective. The coach will watch the game and pick out moments when we are not defending in our system and provide feedback about why we are not doing it and make people accountable if they are not in the correct system in order to learn from it. He will also look at positive examples, when we are sticking to our system and gain a positive outcome, and highlight and rewards players so the rest of the team and myself are aware of the appropriate action and are constantly improving. The defence coach will then look ahead at the opposition coming up and he will present a little bit on how they will attack and highlight any specific areas we need to be wary about. So for example a team like 'Team N' who rely on their forward pack quite a lot in attack and try to dominant teams around the breakdown so that is something the defence coach has highlighted today and be hot on for the match at the weekend. We will then go out following the meeting and put in things, which have been raised into practice.

If you have made an error in a game, do you find it difficult to watch the video and does that make you afraid?

- You probably know, in the game if you make an error you will automatically know that it will be brought up in a debrief session, but I think that it is a very good thing. For me the fear of failure is a powerful driving force and know one wants to be picked out for making a mistake, know one likes making errors and I think it can be quite a powerful thing. But it does depend on the individual, some players can take criticisms better than others. However I think the key thing is that the coaches will always provide you with constructive feedback and it is always about improving your performance rather than focusing on your previous performances. At the day whether it comes across harsh at the time or not it is still about improving performances. The coaches have made the players aware of the process.

If you have made an error in the game, will the relevant coach approach you and arrange an individual feedback session, or what is the process?

- Yeah so now and again the coach will grab you to one side for a couple of seconds to discuss the issue, which I think is very important to have that one on one time. Sometimes the coaches do this before the team debriefs, to prepare you for what is coming, you know it's coming, but I think it is a nice touch.

Do you think it is better if the coaches inform individuals of the content before team sessions?

- I do not think it really matters, but then again it does depend on the situation and the individual but I think the coaches knows you well enough as to whether the individual should be informed as they know how each player will react. I know the coaches take some players to the side before whereas other players they discuss the situation following the session.

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Is that the same for all the coaches at the club?

- I think there are differences but then that is due to the coaches individual personalities. Also with the coach we have discussed, we play to a set system and it is therefore quite easy to identify if a player has completed a specific error. Whereas in our attack, it is harder to observe and therefore players are made less accountable for their errors or coming out of the attacking system. Therefore the use of performance analysis within the attacking and defensive debriefs differs, whether that is due to an individual coach or not I am not sure but that is just the way it is

Opposition

Regarding upcoming opponents, how do the coaches and yourself utilise performance analysis to prepare you for the upcoming matches?

- Again, I think it is the case of scouring over footage of the team's previous games, I think the forwards tend to focus on the statistics more than the backs, so things like the lineouts and the scrums, so they can find out who is the individual player who is taking the most lineouts and therefore they can defend the player more. Whereas backs, tend to look at footage of ways in which we can attack against the opposition, and identify ways in which the opposition are likely to attack against us in order to prepare the game plan.

When analysing opponents would you look for specific cues?

- For me, given my playing position and the opportunities I get during a game, I specifically focus upon how a team will counter attack and examine the implications on how I exit, how I kick, where I kick, who it is I am looking to pinpoint or target. I will also look at how they then counter attack, which will have implications on our defence. I also look at how other teams counter attack against the opposition so I can see if there are any weaknesses within their defensive formations, how they kick chase and other things like that in order to aid my performance.

Conclusion

Do you have an active role in the performance analysis process or is it just given to you?

- The information tends to be given to us, I think it is a bit of individual responsibility. I myself will then go and watch footage of the opposition whereas other players might not, I think it is quite an individual thing it depends on what you enjoy or not so much enjoy but works for you or does not work for you.

Would you therefore prefer to have an active role in the performance analysis sessions?

- It does depend on the situation and the previous match we have played. There are certain things where you can watch a specific incident once and it registers with you and you do not need to worry about walking through the situation because it is in the brain and you can tick it off that way.

Do you think you learn more when you have an active role in the sessions?

- Yes I think to a certain extent because I think it is something I have sort after myself and naturally I think I probably take in a little bit more but then that not to

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say, if you are set a challenge by the coach to look at certain things, it is not to say that you would not take in a lot of information as well.

How much do you think of the information you watched or are given in the week you actually remember or utilise in a game?

- err probably not a lot too be honest, not a massive amount, it is sort of the importance things you will remember and there will be situations in the game were you will recognise something which you or the coaches have highlighted in the week. Whether it is the way the opposition set up an attack and therefore you might recognise what is coming next. I think that is invaluable but I think as an overall thing from the amount of information I personally will only recall maybe 5-10% that we are taking away but then that can be the difference between conceding a try or not.

Where has performance analysis hindered your performance?

- It has not happened massively, but there has been a couple of times in the past were we have highlighted specific individuals to target their perceived weaknesses and they have ended up going on and playing an absolute storming game and you just did not see it coming and sometimes that is just the way it is. But other than that it is a really useful tool.

Do you see performance analysis as a tool to assist your performance or a tool to be afraid of? And why?

- Personally I think it is a tool to assist performance, because it allows you to get an insight into firstly the opposition and how they might be playing, secondly an insight into how you maybe able to score points against them, thirdly, an insight into your own personal game, if there are any glaring statistics were you are making errors in certain positions or certain moves therefore it provides you with an idea of things you can work on in order to improve your individual game, then they will all be highlighted.

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7.9. Appendix 3.9 – Questionnaire

Performance Analysis within Elite Rugby Union: A Players Perspective

Please tick here to confirm you have read the information enclosed at the end of the questionnaire and consent to participation within the study.

Age:..... **Gender** (please circle): Male Female

Nationality (please circle): English Welsh Scottish Other....

Current Club Location (please circle): England Wales Scotland
Other:.....

Normal Playing Position (please circle one): Front-Row Second-Row
Back-Row Half-Backs Centres Back-Three

Current Performance Level (please circle all relevant): International Premiership
Championship Academy Other:.....

Highest performance level:

Code (please circle): 15-a-side Sevens

I have played for (please circle): 1-2 clubs 3-4 clubs 5-6 clubs 7+

How many of the clubs have had access to performance analysis:

What performance analysis software do you have access to?.....

+++++
When answering the following questions, please refer to the below definition:

“Performance analysis is the use of video to support learning and understanding of your own performance and your teams performance, in addition to preparing you for upcoming opponents”

1. How important is performance analysis to your performance (please circle)?
Very Important Very Unimportant
1 2 3 4 5

2. Describe how performance analysis has aided your performance:
.....
.....

3. Briefly outline your weekly interactions with performance analysis?
.....
.....

4.A) Do you think the format is suitable for your learning needs (please circle)?
YES NO

4.B) Explain the reasons for making the above decision?
.....
.....

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4.C) How would you like performance analysis sessions to be delivered in the future?

.....
.....

Feedback and Learning

5. How do you evaluate your own playing performance?

.....
.....

6. How do the coaches provide feedback to you and what do you think of the quality of the feedback?

.....
.....

7. Do the coaches use performance analysis to deliver feedback (please circle)?

YES (go to Q.9)

NO (go to Q.8)

8. Would you like the coaches to use performance analysis (please circle)?

YES

NO

9. What do you think about the current delivery method?

.....
.....

10. How would you like you feedback to be delivered in the future and why?

.....
.....

11. When receiving team feedback, what do the coaches focus on?

.....
.....

12. What information from these sessions do you remember?

.....
.....

13. Do you ever use performance analysis to analyse an individual skill (please circle)?

YES (go to Q.14)

NO (go to Q.15)

14. What skills have you analysed and did it benefit your overall playing performance?

.....
.....

Match Preparation

15. How do the coaches use performance analysis to prepare you for opponents?

.....
.....

16. What information would you like to view when preparing for matches?

.....
.....

17. Are you involved in gathering and presenting information about opponents (please circle)?

YES

NO

18. Describe the information you collect or would like to collect?

.....
.....

19. Have you analysed individual players?

YES

NO

20. What elements of their play do you specifically look at?

.....
.....

21. How useful do you find analysing opponents:

	Very Important		Very Unimportant
- Overall Performance	1	2 3	4 5
- Opposition Strengths	1	2 3	4 5

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- Opposition Weaknesses	1	2	3	4	5
- Opposition Game Plan	1	2	3	4	5

22. What percentage of the information you receive during the week, are you able to recall during a match?
.....

23. Do you think this would increase if you were involved in gathering and presenting information?
.....

YES NO

Summary

24. Do you see performance analysis as a tool (please tick):-

- to assist and benefit your performance
- you are afraid of and do not see the importance

25. What are your reasons for making the above choice?
.....
.....
.....
.....

26. If you could change one thing about the clubs/teams use of performance analysis, what would it be?
.....
.....

Thank you for completing the questionnaire

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7.10. Appendix 3.10 – Interview Questions

1. Can you please provide a practical example of where performance analysis has assisted you in training?
2. Can you please provide a practical example of where performance analysis has inhibited you in training?
3. Can you please provide a practical example of where performance analysis has assisted you in a match?
4. Can you please provide a practical example of where performance analysis has inhibited you in a match?

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7.11. Appendix 3.11 – Gate Keeper Permission

Phil Davies <phil.davies@cardiffblues.com>

13 November 2012 18:45

To: "John Francis" <john_francis1991@hotmail.co.uk>

Cc: "Gafyn Cooper" <gafyn.cooper@cardiffblues.com>, "Rhodri Manning" <Rhodri.manning@cardiffblues.com>

Re: Performance Analysis Project

1 Attachment, 30 KB

John,

Good to hear from you and I'm pleased your studies are progressing well.

That should not be a problem, if you contact my Operations Manager, Mr Gafyn Cooper, he can arrange your visit.

Take care

Phil

Phil Davies
Cardiff Blues Director of Rugby

—
Cardiff Blues Training Centre
The Vale Pavilion
Hensol Park
Hensol
Vale of Glamorgan
CF72 8JY

—
Email: phil.davies@cardiffblues.com
Work: 01443 627782



On 13 Nov 2012, at 12:23, John Francis <john_francis1991@hotmail.co.uk> wrote:

Hi Phil,

I hope you are well.

I am currently undertaking a Masters in Sports Coaching at the University of Worcester and for my dissertation I am hoping to complete a project which aims to consider rugby union players perception regarding the use of performance analysis within their every day practice.

I was wonder if I would be able to come down to Cardiff some time during Jan or Feb and get the 1st XV and academy players to complete a few questionnaires and possible interview a few players. Is this something which might be possible?

Kind regards,

John Francis

Masters Student
Institute of Sport and Exercise Science
University of Worcester
Harnick Grove
Worcester
WR2 6AJ

Tel: 07944 036255

Elite Rugby Union Players Perceptions Towards Performance Analysis

From: **Richard Hill** (Richard.Hill@warriors.co.uk) You moved this message to its current location.
Sent: 28 November 2012 12:56:07
To: John Francis (john_francis1991@hotmail.co.uk)

John

More than happy for this

Come in and see me anytime you are around

Richard

On 28/11/2012 12:49, "John Francis" <john_francis1991@hotmail.co.uk> wrote:

Hi Richard,

Hope you are well.

I was wondering if it would be possible to come and meet you regarding some research I will be required to complete for my Masters degree in 2013.

I am going to complete a project which aims to consider rugby union players perception regarding the use of performance analysis within their every day practice and will require players to complete a questionnaire and interview a handful of players.

If this is something which might be possible I would be happy to discuss the idea with you in more detail.

Kind regards,

John Francis

Masters Student
Institute of Sport and Exercise Science
University of Worcester
Henwick Grove
Worcester
WR2 6AJ

Tel: 07944 036255

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7.12. Appendix 3.12 – Interview Consent Forms

Project title: Elite rugby union players perceptions towards performance analysis.

Thank you for showing an interest in this project. Please read all the information in this leaflet carefully. Then please consider whether you wish to take part in this project. Participation in this study is completely voluntary. If you decide to take part, you will be asked to sign this form. If you decide that you do not wish to participate, then please appropriately discard this leaflet or hand it back to the researcher. Regardless of your decision, I thank you for your time.

What are the aims of the project?

The main aims of the project are:

To identify the perceptions elite level rugby union currently have regarding the use of performance analysis in improving their own playing performance and in highlighting the strengths and weaknesses of upcoming opponents.

What will you be asked to do?

Procedures

If you agree to take part, you will be asked take part in an interview, which will take a maximum of 30 minutes of your time.

Risks and discomfort

The only risk that you may face by taking part in this project is psychological, as some of the topics require you to reflect on previous experiences. If you experience any degree of discomfort at any stage of the completion of the questionnaire or the interview then you can withdraw from the study without any future consequence.

Safety

All collected data will be stored within a lockable draw and/or a password protected hard drive. As the chief researcher I must consider your social and psychological wellbeing. If you feel that these are at risk and you wish to withdraw from the study then you can do that anytime without explaining your reasons to the chief investigator (John Francis).

Injury

It is unlikely that you would get physically injured during this study as it does not require you to do anything physical. However if you feel uncomfortable with completing the questionnaire or being part of the interview you can withdraw anytime without explaining your reasons.

Benefits

The benefits that you will gain by taking part in this study are:

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An understanding of why and how people get their perceptions about performance analysis.

A potential improvement in the delivery of performance analysis at your current club. Also, by taking part, you will help us to increase knowledge of the area being studied.

Can I withdraw from this study?

You can change your mind and decide not to take part any time. If you decide to withdraw from the study, you do not have to give any reason for your decision, and you will not be disadvantaged in any way.

What information will be collected, and how will it be used?

The data collected from the interviews will be qualitative in nature (your thoughts and feelings) and will be compared to other views. These data will then be analysed, interpreted and be written up as part of a research handling assignment.

The findings of this project may be published, but the information will not be linked to any specific person. Your anonymity is carefully guarded and I promise full confidentiality. A copy of the results and/or your interview transcript may be given to you upon request. The raw data will be discarded after the completion of studies. Should you require further information please do not hesitate to contact the Chief Investigator, John Francis, at any of the testing sessions or via e-mail (j.francis@worc.ac.uk), or Gareth Jones, supervisor, at g.jones@worc.ac.uk.]

Statement by participant

I have volunteered to take part in this project

I know I can withdraw at any time without being disadvantaged

I am satisfied that the results will be stored securely

I know that the results may be published, but they will not be linked to me

I am aware of any possible risks and discomfort

I agree to inform the researcher immediately if I feel uncomfortable

I have had the chance to ask questions regarding the study

I know that I will not receive any money for taking part

If you have concerns about any aspect of this study you should ask to speak to the researcher(s) who will do their best to answer your questions. However, if you have further concerns and wish to complain formally about any aspect of or about the way you have been treated during the study, you may contact Dr John-Paul Wilson on (01905) 54 2196.

I have read and understood this form it. I agree to take part in the project entitled Perceptions of performance analysis within rugby union.

Signed (Participant):

Date:

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I have read and understood this form it. I agree to take part in the project entitled Perceptions of performance analysis within rugby union.

Signed (Participant): *R. Watts-Jones* Date: 30.4.2013

I agree to inform the researcher immediately if I feel uncomfortable
I have had the chance to ask questions regarding the study
I know that I will not receive any money for taking part

If you have concerns about any aspect of this study you should ask to speak to the researcher(s) who will do their best to answer your questions. However, if you have further concerns and wish to complain formally about any aspect of or about the way you have been treated during the study, you may contact Dr John-Paul Wilson on (01905) 54 2196.

I have read and understood this form it. I agree to take part in the project entitled Perceptions of performance analysis within rugby union.

Signed (Participant): *Lewis Jones* Date: 30.4.2013

I agree to inform the researcher immediately if I feel uncomfortable
I have had the chance to ask questions regarding the study
I know that I will not receive any money for taking part

If you have concerns about any aspect of this study you should ask to speak to the researcher(s) who will do their best to answer your questions. However, if you have further concerns and wish to complain formally about any aspect of or about the way you have been treated during the study, you may contact Dr John-Paul Wilson on (01905) 54 2196.

I have read and understood this form it. I agree to take part in the project entitled Perceptions of performance analysis within rugby union.

Signed (Participant): *Stalk* Date: 25.4.13

I know I can withdraw at any time
I am satisfied that the results will be anonymous
I know that the results may be published but they will not be linked to me
I am aware of any possible risks
I agree to inform the researcher immediately if I feel uncomfortable
I have had the chance to ask questions regarding the study

I know that I will not receive any money for taking part

If you have concerns about any aspect of this study you should ask to speak to the researcher(s) who will do their best to answer your questions. However, if you have further concerns and wish to complain formally about any aspect of or about the way you have been treated during the study, you may contact Dr John-Paul Wilson on (01905) 54 2196.

I have read and understood this form it. I agree to take part in the project entitled Perceptions of performance analysis within rugby union.

Signed (Participant): *Matt Mullan* Date: 25.4.13

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7.13. Appendix 3.13 – Interview Member-Checking

I confirm the content of the transcript provides a representation of the comments I made during an interview regarding my perceptions towards performance analysis.

Signature: Matt Mullan

Date: 25.4.13

I confirm the content of the transcript provides a representation of the comments I made during an interview regarding my perceptions towards performance analysis.

Signature: Clark

Date: 25.4.13

I confirm the content of the transcript provides a representation of the comments I made during an interview regarding my perceptions towards performance analysis.

Signature: R. Watts-Jones

Date: 30.4.2013

I confirm the content of the transcript provides a representation of the comments I made during an interview regarding my perceptions towards performance analysis.

Signature: Lewis Jones

Date: 30.4.2013

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7.14. Appendix 4.1 – Interview One Transcript

- Interviewer Can you please provide a practical example of where performance analysis has assisted you in training?
- Interviewee Probably the defence work we do, the defence coaches break down some of the one on one tackles we make in a game so they can slow the video down and show you where you have possibly gone wrong in a tackle.
- Interviewer Is it useful having that ability to slow down the video and watch it in slow motion?
- Interviewee Yeah defiantly.
- Interviewer So what advantage does that have to your performance?
- Interviewee Enables you to breakdown that skill, into different components as opposed to watching it in full time as all you see is the end result but if you slow it down you can see where your feet are positioned, where your shoulders are, if your feet are square, if you have pushed up quickly, it breaks the whole skill down.
- Interviewer So, one example of where performance analysis in training has hindered your performance or made you confused.
- Interviewee Honestly I don't think that has ever happened.
- Interviewer Ok so just flipping over to match preparation, can you provide another example where performance analysis has helped you?
- Interviewee Possible a teams kicking strategy, when they kick out of their 22m, so the analysis is done in the week to ensure the players know what strategies they use, how you can position yourselves depending on what position you play, so one week we had a blind side winger and the blind side flanker dropped to add to our back three so that helped the team certainly.
- Interviewer So from the video are you able to visualise that more?
- Interviewee You can see their set-ups, its all very well someone telling you or writing the odd sketch down, but if you see it and especially it reinforces it if you see it happening in consecutive games, so a few games where you see the same thing happening, you know that they will pretty much go to do it.
- Interviewer Have you ever got confused with the information the coaches are providing?
- Interviewee No
- Interviewer After a match having that information feed back to you, maybe on a Monday, can you provide another practical example where you have gone, yes that makes sense and I can visualise that and take the feedback on board?
- Interviewee Yeah I mean for instance, as a back rower you hit a fair few rucks during a game, one ruck you might not have hit correctly and that affected the speed of ball and possibly as a result the overlap which you had didn't count as the team had a chance to defend and get their defence up. So basically breaking that skill

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down again and then being able to put it into practice and do drills and stuff.

Interviewer Out of your professional career, how important has performance analysis been to your performance?

Interviewee It just gives you a different view of what is happening, normally you only see the game through your own eyes but the footage allows you to see the game from 30-40 feet away and then you can see the bigger picture.

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7.15. Appendix 4.2 – Interview Two Transcript

- Interviewer Within training has performance analysis helped you and can you give an example?
- Interviewee It has definitely helped me, so when we train we get filmed, the training is quick so there is no standing around and you cant go back to what you have done wrong but you get a big break at lunch time and so you get to go in and all the training is put on the server and individually you can have a look or go over with the coaches and have a look at what you can improve.
- Interviewer Would you like to have that footage available on the touch line whilst you are doing a training session?
- Interviewee We have done that in the past, we have had an ipad there and because the sessions are not individually, when you're out there, it would be quite start and stop, and the boys get stiff. Personally, I prefer coming in after training and looking at the footage and then the next day I can come out and do it properly.
- Interviewer Regarding match preparation, were has performance analysis helped you?
- Interviewee On an individual basis I, maybe one or two days before a game I will have a look at the opposition on there attack and there defence. Individually. But today we had a debrief about our opposition on the weekend so it helps massively.
- Interviewer What do you specifically look at within the individuals?
- Interviewee I look at the threats so which foot are they going to side step off and their strongest passing hand, so you know where to hand off or were to blitz, so get right up in their face as they are uncomfortable when passing off their right hand, knowing if they will kick and which foot, so their things which I look at.
- Interviewer IS that information but into the codes or is this something you have to do additionally?
- Interviewee The analysis team put the attack and the defence up there, but I don't tend to look at the information encase they have missed something but they do a great job, I personally go to the games, so for example if we are playing Team S, I will go have a look at their lineout attack and scrum attack so that I would be preparing myself.
- Interviewer What do you think the fundamental reason is for performance analysis helping your performance?
- Interviewee It improves your game, years and years ago they didn't have this and you couldn't look at your negatives. I think its great for looking at things you can improve. But if I had one sort of negative, it would be with accessibility, all the boys have macbooks, maybe the boys could have the codes but on our laptops so maybe that is things we could have given to us and we could take that home with us.

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7.16. Appendix 4.3 – Interview Three Transcript

Interviewer	As a forward, has performance analysis helped you within a training environment?
Interviewee	Yes, it gives you immediate feedback, so we could video a scrummaging session and watch it on a delay before we go into the next scrum
Interviewer	How often do the coaches do that with the delay in training?
Interviewee	Not that frequently but tends to be used around a skill based session because there is quiet a lot of stopping and watching the video and talking about what to do next and correcting what went wrong.
Interviewer	Do you find that useful to your learning and development?
Interviewee	I like learning like that because rather than watching 12 or 15 clips and watching them at the end of a session, you can watch them and pick up one or two things immediately and correct them before the next session.
Interviewer	Regarding opposition, how helpful has it been watching clips prior to competing against them?
Interviewee	I use it every week with out a doubt, I will watch clips of the person opposite me, particularly based around the scrum, I will watch for particular trends or traits, little things I can pick up on which will help me during the game.
Interviewer	As a forward do you look at the referee and the engagement timing?
Interviewee	The referees tend to be the same, although for me its nice to be aware of it but for me I would be happy going into the game not knowing because its more about what the person opposite me will do.
Interviewer	So do you look at their binding and body positions?
Interviewee	Yes things like how they set up, if they have one foot in front of the other which means they are only able to go in one way, if they move their foot on engagement then their shoulders and what their doing with their bind, all sort of things like that.
Interviewer	Following a match, the coaches utilise performance analysis as part of the feedback process, can you provide an example where you have taken the feedback into training and its been a positive effect?
Interviewee	Yes as simple as a rucking technique, and you have not cleaned out effectively the coaches can sit you down and show you that you have done it and tried it, then drills in the week can be based around that and hopefully get you ready for the next game.

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- Interviewer What is the process the coaches go through to provide you with the feedback?
- Interviewee Tends to be sit down in front of a screen and they will pin point things and slow it down, make you justify why you used that technique, why you chose to ruck out in that way, and then they will say maybe next time you could do this or if you are going to do that technique you could have done this better, then they will incorporate this into drills and provide you with additional feedback.
- Interviewer How useful do you find performance analysis to your overall performance?
- Interviewee I think its useful because the camera doesn't lie. You can come away from the game thinking certain things went differently in the game to how they actually happened on the video. It highlights every little detail and if its used effectively to help progress you in the right way then I think it's a beneficial tool.

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7.17. Appendix 4.4 – Interview Four Transcript

- Interviewer Can you provide me an example were performance analysis has helped you in a training environment?
- Interviewee It helps me to analyse the opposition, especially the lineouts, I will use it to see how they defend, in order for me to see which lineouts will work for us, and I will know how they will attack so we can alter our defence to suit their attack.
- Interviewer Do the coaches tell you that information or do you gather that information yourself?
- Interviewee I do that myself.
- Interviewer How long do you spend doing that?
- Interviewee It various, maybe sometimes half an hour or sometimes an hour an a half.
- Interviewer Do you enjoy doing that or do you find it a chore?
- Interviewee A bit of both, it does interest me but on the other hand it needs to be done.
- Interviewer During a training briefing session, has there ever been an occasion when a coach has shown you a clip and you have misunderstood or are not sure of the purpose of it being shown?
- Interviewee Yes, we have had it this year were we are shown a mass of information were some of it is not necessary.
- Interviewer What do you think the coaches and analysts can do towards that?
- Interviewee Short clips so this is what we do, show the clip and explain what to do rather than showing lots and lots of different clips that aren't really relevant, show the important ones and show them once instead of showing the same situation against five different teams.
- Interviewer With match preparation, you mentioned about the lineout, do you look at anything else as a forward?
- Interviewee Me personally no.
- Interviewer Do you sometimes look at the rucks and other things?
- Interviewee Sometimes we break off into splinter groups were the back row will present to us but for me personally no.
- Interviewer Following a match, do you find it useful how the coaches use video to support their feedback?
- Interviewer Well I go through the lineouts on my own to see how they went but then the coach will get all the forwards together to talk about what went right and what went wrong, and then also we will have a review of the game to evaluate aspects, so for example we scored a try and this went well but we missed these opportunities were these points went wrong
- Interviewee Finally, do you think performance analysis is useful to rugby players?

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Interviewee Yes, because it gives you a, normally you are in a game against a team you have never seen before and you have to figure the team out as you play, but with the English premiership you have matches back to back so you can begin to identify certain styles of play, so instead of getting to half time to identify what the opposition are doing, you can do that analysis before the game so you can hit the ground running