Cardiff School of Sport
DISSERTATION ASSESSMENT PROFORMA:
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Student name: Mathew James	***Student ID:*** ST10001651
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Dissertation title:	Evaluation of a performance analysis intervention within a youth tennis squad
Supervisor:	Adam Cullinane

Comments	Section
	Title and Abstract Title to include: A concise indication of the research question/problem. Abstract to include: A concise summary of the empirical study undertaken.
	Introduction and literature review To include: outline of context (theoretical/conceptual/applied) for the question; analysis of findings of previous related research including gaps in the literature and relevant contributions; logical flow to, and clear presentation of the research problem/ question; an indication of any research expectations, (i.e., hypotheses if applicable).
	Methods and Research Design To include: details of the research design and justification for the methods applied; participant details; comprehensive replicable protocol.
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	Discussion and Conclusions [2] To include: collation of information and ideas and evaluation of those ideas relative to the extant literature/concept/theory and research question/problem; adoption of a personal position on the study by linking and combining different elements of the data reported; discussion of the real-life impact of

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	your research findings for coaches and/or practitioners (i.e. practical implications); discussion of the limitations and a critical reflection of the approach/process adopted; and indication of potential improvements and future developments building on the study; and a conclusion which summarises the relationship between the research question and the major findings.
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CARDIFF METROPOLITAN UNIVERSITY
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CARDIFF SCHOOL OF SPORT

DEGREE OF BACHELOR OF SCIENCE (HONOURS)

SPORTS COACHING

EVALUATION OF A PERFORMANCE ANALYSIS INTERVENTION WITHIN A YOUTH TENNIS SQUAD

PERFORMANCE ANALYSIS

MATHEW WILLIAM JAMES

ST10001651

MATHEW WILLIAM JAMES

ST10001651

CARDIFF SCHOOL OF SPORT

CARDIFF METROPOLITAN UNIVERSITY

EVALUATION OF A PERFORMANCE ANALYSIS INTERVENTION WITHIN A YOUTH TENNIS SQUAD

Cardiff Metropolitan University
Prifysgol Fetropolitan Caerdydd

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Abstract

The use of performance analysis is becoming ever more prominent within the world of sport due to its increasing accessibility (Blaze et al., 2004). The literature within the field however is often game characteristic based using quantitative means with little attention on its place within the coaching process. The purpose of this study was to explore the effect a performance analysis intervention had on a 'performance' level tennis squad from a coaching perspective.

A qualitative approach was selected to help capture the thoughts, feelings and experiences of the coaches (Gratton & Jones, 2004, 2010). Following a 10-week intervention consisting of three performance analysis processes (instructional video, match analysis and real-time analysis) semi-structured interviews were conducted with the head coach and assistant coach of the squad. Field notes made by the researcher (also an assistant coach in the squad) were made throughout and used as additional data.

The main finding of the study showed how a mixture of trial and error along with constant reflection 'in' action improved the efficiency and effectiveness of the performance analysis processes. It was highlighted how this allowed the processes to be shaped around the habitus of the players. Assistant coaches undertaking the analysis with good communication with the head coach was also perceived as essential for the success of the intervention.

The results of the study provide support for coaching process models to include a degree of performance analysis. Furthermore, the results confirmed the difficulties of modelling the coaching process due to its ambiguity from all social variables involved (Jones & Wallace, 2005).

CHAPTER ONE

INTRODUCTION

CHAPTER ONE: INTRODUCTION

1.0   Introduction

Feedback is described as one of the most important elements affecting 'learning and subsequent performance of a skill' (Maslovat & Franks, 2008). However, coaches traditionally use subjective information to evaluate performance, thus limiting its reliability and accuracy.

Whilst performance analysis has become a key part of many coaching infrastructures within sport, little attention has been placed upon investigating the best way to implement it within the coaching process. (Groom, Cushion & Nelson, 2011). The use of performance analysis has grown over the past decade due to its accessibility (Blaze, Atkinson, Flarwood and Cale, 2004), particularly with the array of commercial systems available for analysis (James, 2009). Yet research within performance analysis has mainly been quantitative, looking into the 'what' of performance analysis.

There are a dearth of studies within performance analysis that utilise qualitative research methods. Currently only one study (Butterworth, Turner and Johnstone, 2012) explores the coaches' perception of performance analysis within sport. While models describe the coaching process as an unproblematic shift in performance (Côté, Salmela, Trudel, Baria & Russell, 1995) it is contested that the process is full of ambiguity due to the social variables involved (Jones & Wallace, 2005).

A range of researchers (Williams, 1999; Liebermann, Katz, Hughes, Bartlett, McClements and Franks, 2002; Stratton, Reilly, Williams & Richardson, 2004) suggested that the optimal use of data within the coaching process is still unknown. Consequently, the delivery of performance analysis is often unstructured and reactive, rather than proactive (Groom et al., 2011; Cushion & Smith, 2006). Although no study has proven that the application of performance analysis processes causes a significant improvement in sport, reports have shown its potential (Brown & Hughes, 1995; Murray, Maylor & Hughes, 1998).

Expanding on the work of Butterworth et al. (2012) the present study will explore two coaches' perceptions of the impact and usefulness performance analysis has within the coaching process. The study will be conducted using qualitative research methods in the form of an evaluation study, using semi-structured interviews and field notes. The study aims to investigate how the intervention impacted upon coaching practice and identify how impactful analysis is within the coaching process. Additionally, providing empirical evidence on the optimal way performance analysis can be utilised using action research.

The intervention will be conducted within tennis and applied to a 'performance squad' at Cardiff Metropolitans XL Academy. A de-limitation of the study includes its inability to generalise to a large population due to the ambiguity of the coaching process and small sample used. The two coaches involved in the process will be subject to a semi-structured style interview at the end of the intervention.

CHAPTER TWO
REVIEW OF LITERATURE

CHAPTER TWO: REVIEW OF LITERATURE

2.0   Introduction

A large body of qualitative literature exists in disciplines such as coaching science and psychology due to its ability to help understand experiences, feelings and emotions. Early research within psychology was dominated by a quantitative approach. It provided useful information yet it was limited to numerical data (Gratton & Jones, 2010), which Krane, Anderson and Stean (1997) argued to be not relevant in understanding meaningful concepts. Qualitative research has grown in importance within sport studies such as psychology as a deeper understanding is needed than quantitative measures. For this reason qualitative research is no longer seen as 'inferior' to quantitative research. Although qualitative research captures unquantifiable meanings such as experiences, it is often conducted to a smaller sample, making it more difficult to generalise results to a wider population (Gratton & Jones, 2010).

To date, performance analysis research has traditionally been focussed on the role it can play in enhancing sports performance, which can have limited practical value to coaches (James, 2006). Cushion et al. (2006) argued that research assumes the performance analysis sequence is a linear and unproblematic process leading to improved performance. This is represented via simplistic charts and schemas (Carling, Williams & Reilly, 2005; Hughes & Franks, 2004). Empirical research has greater potential for explaining coaching practice (Lyle, 2002) and is needed to represent the process (Cushion, Armour & Jones, 2006). There is a dearth of literature existing around the integration of performance analysis within the coaching process (Wright, Atkins & Jones, 2012). James (2009) suggested that information regarding how coaches modify practice after analysis is kept secretive from the fear of losing a 'competitive edge'.

O'Donoghue (2010) implied that improved knowledge of phenomena of interest through research is often not utilised within practice. This is due to research and action being conducted by different groups of individuals. This provides support for the use of action research whenever 'specific knowledge is required about a

practical problem' (O'Donoghue, 2010, p36). Kemmis and McTaggart (1992, p5) suggested that this tool could improve the 'rationality and justice of own social or educational practice'.

The action research process is longitudinal as a consistent sample group is used to measure particular variables over an extended period of time (Gratton & Jones, 2010). It contains four phases (planning, acting, observing and reflecting) that are repeated constantly. The continuous cycle leads to improved understanding and learning (Tsai, Pan & Chiang, 2004) through continually integrating theory into practice before reflection. Elements key to its success include a critically informed action plan using observations and interpretations.

Reflection is commonly described as a 'process to consider something in more detail' (Moon, 1999, p4), resulting in developing knowledge and leading to change (Hanton, Cropley & Lee, 2009). Data recorded from a sports performance aids athletes within a reflective cycle such as Gibbs' (1998) model (Fig. 1) by providing a more accurate description.
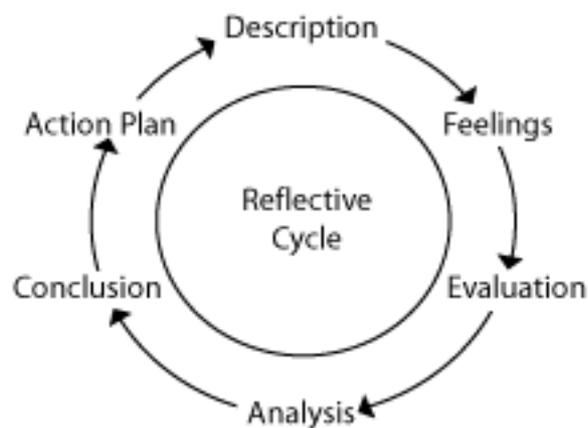

Figure 1. Gibbs' (1988) Reflective Model

Without conducting critical reflection the action research will less likely lead to gradual improvements. As suggested by Ghaye, Danai, Cuthbert and Dennis, (1996), practice must be looked at and made sense of if it is to affect future action. Reflective methods are commonly used within sport literature to gain a better

understanding of phenomena. Most appropriately when social interactions are concerned, such as coach-athlete relationships (Groom & Cushion, 2005) or looking at one's own experience (Cropley, Miles, Hanton & Niven 2007). Within the present study, elements of reflection will form a key part in unearthing the most effective ways of implementing performance analysis within the coaching process. Firstly, flexibility in the interventions will allow constant reflection to change and develop the performance analysis processes. Additionally, at the end of the intervention, a critical reflection will be used to evaluate its success in relation to athlete performance and effectiveness for the coaches.

2.1   Feedback

Augmented feedback plays a vital role in facilitating the skill acquisition process (Magill, 2004), yet interventions by coaches traditionally involve 'subjective observations' based on their past experiences, perceptions and bias (Maslovat & Franks, 2008). Performance analysis allows for more objective information, enhancing a coach's ability to identify, diagnose and assist (Lyle, 2002; Hodges & Franks, 2004), resulting in more accurate feedback although it is argued that objective approaches do not protect against bias but merely disguise it (Patton, 2002). To utilise the feedback given to an athlete, the coach must still present the augmented feedback in the correct way (Schmidt, 1975). Magill (2004) recognised that learning can be hindered through too much augmented feedback resulting in dependence on it, while studies have shown the timing and content of feedback is also important (Groom & Cushion, 2005; Jenkins, Morgan and O'Donoghue, 2007). Jenkins et al. (2007) conducted a study in which feedback to the coach was given four days after matches were played, yet it is suggested that feedback should be given as soon after the performance as possible (Hastie & Hannan, 1990; Kormelink & Seeverns 2003).

Groom and Cushion (2005) found that the balance of positive and negative types of videos displayed had an influence on the impact of the feedback. Some players found negative feedback harder to deal with than others. This showed the individual differences that coaches must be aware of when presenting feedback, especially to a young population as within their study (under 17). Individual

differences are also apparent with how people learn. Magill (2004) stated four general performance characteristics of skill learning: Improvement, consistency, persistence and adaptability.

Performance analysis can play a vital role in assessing whether learning has taken place. However, learning is limited if coaches use information that is subjective when planning coaching sessions (Franks, 2004). Often the ability to recall from human memory is limited, demonstrated by Franks and Miller (1986, 1991) in the identification of football coaches who were less than 45% correct in post-game assessment regarding key occurrences during 45 minutes of a football game. This alone supports the notion that feedback provision can be enhanced with performance analysis processes.

The player centred model of Mayes, O'Donoghue, Garland and Davidson, (2009) incorporates performance analysis which importantly gives the coach more objective data to help inform decisions (O'Donoghue, 2010) when preparing future sessions. This form of planning was highlighted in a study with 93% of coaches stating that performance analysis informed their short-term planning (Wright et al., 2012).
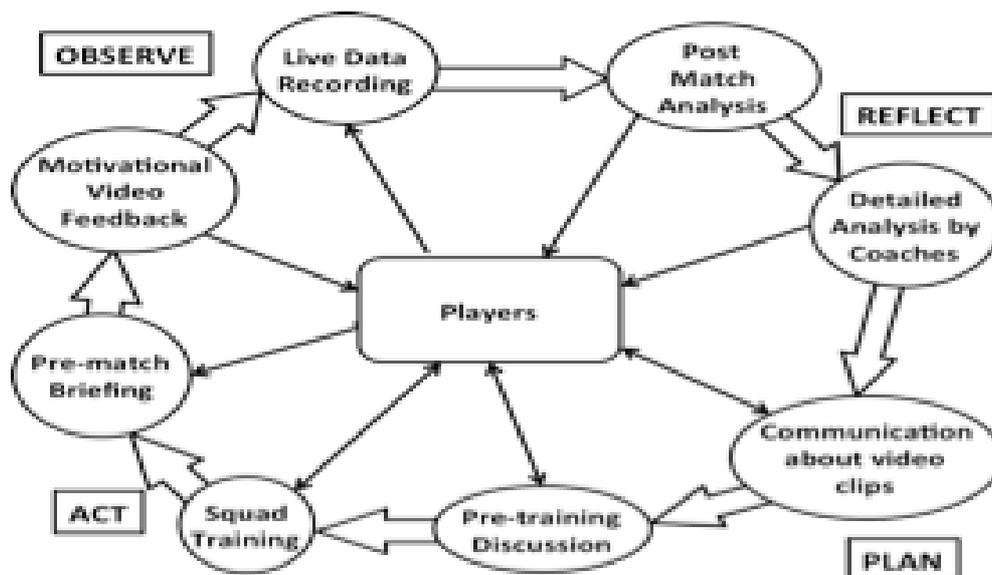

Figure 2. Coaching Process Model (Mayes et al., 2009)

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2.2   Performance Analysis in Sport

Records of performance assessment are not a new phenomenon with the earliest publication of a notation system used to explore the probabilities of success within baseball (Fullerton, 1912). Pencil and paper records have been used by generations of coaches, bench players and interested spectators, usually to produce player statistics. Typically, these involve the identification of key features of play, summarised in tabular and graphical format (Brackenridge & Alderson, 1985). These systems provide 'rich and accurate' data (Hughes & Franks, 2004) but can take many man-hours to process, such as Sanderson and Way's (1977).

An attractive alternative to pencil and paper recording is to make a visual record of a match/performance in order to allow it to be viewed more than once; therefore video has become widely adopted in coaching practice (Brackenridge & Alderson, 1985). By integrating video with computerised systems it is clear to see the advantages it brings for faster analysis (Maslovat & Franks, 2008). As technology and performance analysis continually develop, the role it will play to inform the coaching process is likely to become ever more prevalent (Franks, Hodges & More, 2001).

Regardless of the approach adopted, performance analysis will always be recognised as an objective way of recording performance, meaning critical events in the performance can be quantified in a consistent and reliable manner (Hughes & Bartlett, 2008).

Identified as a key part of the coaching process, performance analysis aids coaches in assessing performance and diagnosing problems (Lyle, 2002). Observations and measurements are conducted to help inform the decision making process by those seeking to enhance sports performance (O'Donoghue, 2010). This is done through identifying areas within performance that are in need of improving (Larid & Waters, 2008). Commonly, data is collected and interpreted before being fed back to an athlete.

It should be recognised that whilst there are endorsements for performance analysis, its inclusions should also be treated with caution (especially when using technology). For example a coach's decision making, although it could be from utilising objective data, it is still dependent on a coach's mind-set and subjective perceptions (Kerwin & Irwin, 2008). Overall coaching philosophy, previous experience with analysis and the perceived threat on coaching status has been suggested to effect impact on its inclusion (Butterworth et al., 2012).

2.3   Types and forms of analysis that can be undertaken

The fundamental applications of analysis can be categorised as:

1.   Tactical evaluation
2.   Technical evaluation
3.   Analysis of movement
4.   Development of a database and modelling
5.   For educational use with both coaches and players.

'A performance indicator is a selection, or combination, of action variables that aims to define some or all aspects of a performance' (Hughes & Bartlett, 2002, p739). The factors that contribute to success differ from one form of sport to another. Winners, shot distribution and serve data can indicate performance in net and wall games whereas shots, goals and passing help indicate performance in invasion games (Hughes & Bartlett, 2002).

Net and wall games are considered to have four main factors: technical, tactical, biomechanical (Hughes & Bartlett, 2002) and mental. Depending on the opposition, surface and other variables, some factors will influence performance more than others. All factors inter-link, and are dependent on each other to maximise potential. Players and coaches devise tactics to assist in accomplishing a particular aim within sport (Carling et al., 2005) and can be the difference between winning and losing (Pearson, 2001). It is typically planned together prior to performance with the use of a great deal of available information (Coe & Miley, 2001). Yet the ability to execute tactics effectively is influenced by the technical

(McKenzie, 1992; Pearson, 2001), biomechanical and mental abilities of individuals.

Research using performance analysis within net and wall games has mainly been based around statistics and relationships. These statistics (O'Donoghue & Ingram, 2001) provide support for statements such as Bollettieri's (2001) that the serve is one of the most important shots in tennis. Yet most research uses statistics produced by IBM at Grand Slam events and therefore only gives an overview of elite tennis. However, key performance indicators have found to change with age (Frcej, 1994) and opposition (McGarry & Franks, 1994; O'Donoghue et al., 2008).

2.4   Why are Performance Analysis processes undertaken?

Lyle (2002) described the coaching process as a planned, coordinated and integrated programme of preparation and competition. However approaches to describe the process have been criticised as being over simplistic and unrealistic (Jones & Wallace, 2005; Cushion, 2007). Relating empirical evidence from organisation theory and educational chance, Jones and Wallace (2005) proposed that a rational approach limits understanding. To help understand the 'why' and 'how' of coaching, a more complex and ambiguous approach is needed (Cushion, 2007). Over time coaching models (Côté et al., 1995; Lyle, 2002) have incorporated the more complex nature that exists in coaching practice. But without any studies orientated toward describing the complexity within coaching, knowledge of the coaching process will remain unjustified and speculative (Saury & Durand, 1998; Cushion et al., 2006; Jones, 2006). The variables that apply to coaching are identifiable but these variables have a 'high degree of dependence on human factors' (Cross & Lyle, 1999).

A coach's role is to 'orchestrate' (Jones & Wallace, 2005), pulling the strings within sessions, making it very difficult to 'observe and measure' the factors, especially within complex and dynamic sports (O'Donoghue, 2010). However through utilising performance analysis, a coach can collect this data to be processed into information (Fig. 3):
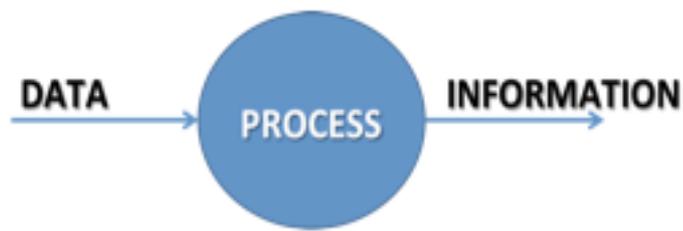
Figure 3. Data processing model, adapted from Pohl (2001)

Although tennis is a well-documented sport, the match characteristics literature (O'Donoghue & Liddle, 1998; O'Donoghue & Ingram, 2001) is limited to a certain population. The research conducted has given an insight into how dependent variables such as strategy and work-rate differ between court surface (O'Donoghue & Ingram, 2001), world rankings and gender (Hughes & Clarke, 1995). Yet no evidence-based practice research informing coaching practice has been conducted, as called for by Franks (2002). The Lawn Tennis Association (LTA) invests millions of pounds (£23.9m in 2012) into grassroots to increase participation and create more elite players for the future. A further £12.3m was then spent in 2012 investing in performance to 'develop talent across the country and on helping amateur players transition into the professional game (LTA, 2012). It is a coach's responsibility to nurture talent and develop players (Lyle, 2002), giving further rationale for empirical evidence on coaching practice. The LTA acknowledge that technology is increasingly playing a more vital role in sport through the addition of performance analysts working with the elite players at the National Tennis Centre (NTC). No other tennis centre across the UK employs an analyst, showing the gap between tennis and sports such as rugby and football where a host of clubs employ multiple analysts.

2.5   Performance Analysis In Coach education

Observation and analysis are key attributes that coaches are expected to possess to help provide good quality feedback to players. The inclusion of observation and analysis units are therefore apparent on coaching courses throughout the UK (Hockey Coaching UK, 2008; Rugby Football League, 2011). Much literature has

reported that the addition of performance analysis could be potentially helpful in improving overall player performance (Brown & Hughes, 1995; Murray et al., 1998). Evidence has shown that performance analysis provide more objective feedback than attempting to recall critical events, yet this is not mirrored within coach education pathways. At levels three, four and five of the UK Coaching Certificate compulsory elements include technique, match and notational analysis (Hockey Coaching UK, 2008; Rugby Football League, 2011; Jones, 2011). However performance analysis is not fully utilised, providing support that a 'gap' exists between research and coaching practice (Goldsmith, 2000).

Wright et al. (2012) found that the long term planning of 70% of coaches is informed by performance analysis. Yet this research was conducted using coaches who have access to, and are already utilising performance analysis. Within the LTA tennis coach pathway, a coach is only introduced to forms of analysis in the latter stages, despite performance analysis being considered a key component within the coaching process (Butterworth et al., 2012).

2.6   Current Research on the use of PA

Research within performance analysis has mainly looked into the role performance analysis can play in enhancing sports performance which James (2006) argued has limited practical value to coaches. Additionally, Mckenzie and Cushion (2012) scrutinised past literature over methodological concerns. Performance is often an uncontrollable and multifaceted phenomenon making it difficult to predict successful future performance. Although the impact of match and notational analysis techniques has been looked at (Brown & Hughes, 1995; Jenkins et al., 2007) O'Donoghue (2010) identified the need for more research within this area. Other areas of performance analysis that a dearth of literature exists includes the 'if and how performance analysis is being integrated within the coaching process' (Wright et al., 2012, p438). Including Wright et al. (2012), a further three articles have looked into the role performance analysis plays within the coaching process: Groom et al., 2011; Bampouras, Cronin & Miller, 2012; Butterworth et al., 2012.

Using performance profiling within badminton, Butterworth et al. (2012) attempted to address the lack of literature that exists within the coaches' perception of performance analysis within the coaching process. Agreeing with much of the literature, Butterworth et al. (2012) found that player specificity was vitally important when deciding if and how analysis should be used. Groom and Cushion (2005) suggested that coaches should be aware of the age and maturity of players when involving them within performance analysis. The performance profiles were found to be most useful in giving the chance of objective feedback to players. However this study only looked into the perception of how performance profiling can be useful within the coaching process when performance analysis has many other forms of feedback.

Wright et al. (2012) used an online survey to increase the understanding of 'how' and 'why' elite coaches engage with performance analysis. Using a sample of 46 elite professional and semi-professional coaches the study investigated how performance analysis tools are utilised. Interestingly, 86% of coaches surveyed used key performance indicators yet only 29% of coaches stated that the indicators remained the same from game to game. Thus, showing the constant state of flux in which the coaching process is in (Jones & Wallace, 2005). 89% of coaches also valued the services of performance analysis and an analyst as 'important' (11%), 'very important' (34%) or 'essential' (46%). However the method adopted in the study did not allow coaches to expand on their responses. Questions remained unanswered regarding what aspects of performance analysis were most important and how it impacted within their coaching process.

A common theme that emerged from the articles was the usefulness of performance analysis within the process. Generally, the studies conducted within performance analysis use participants from a number of different coaching processes making the results less realistic than the 'real-world' of coaching. Bampouras et al. (2012) found that while an athlete was the object and receiver of performance analysis there was little access to the process beyond this point. To reach this conclusion, interviews were conducted with an athlete, international coach and a sport scientist all from different sports. Jones (2006) implied the coaching process is full of ambiguity from the social variables, thus making all

coaching processes different. As a result, the research does not represent the multi-disciplinary relationships that exist within a single coaching process. This has been found to be the case within a large proportion of work relating to performance analysis in football (James, 2009).

As literature highlights, performance analysis can have a major impact on the coaching process leading to higher quality feedback. Yet research has been conducted using individuals from a range of coaching set-ups and often carried out using a questionnaire, limiting results compared with interviews (O'Donoghue, 2012). This creates an obvious demand for a qualitative piece of research looking into the impact performance analysis has upon a single coaching process. The aim of the current study is to evaluate a performance analysis intervention through the collection of qualitative data.

CHAPTER THREE

METHODOLGY

CHAPTER THREE: METHODOLOGY

3.0   Research Design

This study seeks to evaluate the use of performance analysis within the coaching process. Qualitative in nature, the research will use a combination of data sources; these will include semi-structured interviews and field notes in the form of observations and discussions. The adoption of these methods over quantitative methods provides an opportunity to collate 'fuller and richer' data which Gratton and Jones (2010) recognised as a way of enhancing the results gained and provide greater understanding and knowledge.

To date, qualitative studies in performance analysis have used varying numbers of participants. Butterworth et al. (2012) used seven participants, whereas Groom and Cushion (2004) only used two. O'Donoghue (2010) draws attention to the fact that qualitative research in performance analysis is often orientated around previous investigations, but at the same time allows for flexibility in the research design. Therefore the present study will be looking at a single coaching process, with a deeper understanding being the main aim rather than bringing thoughts from separate coaching processes.

3.1   Participants

In partnership with the XL Tennis Academy at Cardiff Metropolitan University the intervention was conducted using 6 male tennis players (aged 10-12) within a junior 'performance' squad. This squad session was chosen due to its accessibility. It was situated at the researcher's University with the researcher also having an assistant coach role within the squad already in place. The Tennis Wales Talent Identification Officer also suggested this squad to be introduced to performance analysis as they were the 'next generation' of Welsh tennis players. The players compete regularly at competitions throughout Great Britain and at the time of study four were ranked in the top 30 nationally of their respective age groups.

Coach A (the head coach of the squad) was female with 12 years experience as a coach and held an LTA Senior Performance Coach Qualification. As head coach it was her responsibility to plan and deliver sessions with two assistant coaches (Coach B and C) during the squad to help with delivery. Outside of the squad she was also the individual coach of two of the participants (Player A and Player D).

Coach B was male, held a Level 3 Tennis Coaching Qualification and 5 years coaching experience. Including the coaching of one of the participants (Player E). The individual was also studying for an MSc in Performance Analysis at Cardiff Metropolitan University.

Coach C (the researcher) held a Level 2 Tennis Coaching Qualification, with 4 years coaching experience and in the final year of a degree in Advanced Coaching Science. Coach C had also completed performance analysis modules at Undergraduate level at the time of the study.

Coach B and C completed all performance analysis processes within the study.

3.2   Structure

The intervention occurred during a two-hour 'performance' squad once a week for a total of 10 weeks. A discussion took place prior to the 10-week period to identify the most effective way to carry out the intervention. This took place between all three coaches. The general session aims and performance indicators of individuals were matched to interventions that would be feasible to carry out with the available resources. Coaches B and C used their knowledge on performance analysis processes to identify what services would be best suited to the session themes described by the head coach. However it was agreed that a degree of flexibility remained to allow the interventions to change or evolve based on the coaches' experiences and perceptions. The interventions were categorised into the following:

3.2.1 Real-time feedback

During sessions footage was gathered using a hand held camera and an ipad. Aspects of play filmed were dependent on what the head coach wished to view during sessions or instances deemed relevant by an assistant coach to show players and/or the head coach. Footage from the hand held camera could be imported onto a laptop and played on a TV screen on the side of the court. Using the 'Coaches Eye' application on an ipad allowed videos to be taken and replayed instantly, with 'free draw' tools available to highlight instances.

3.2.2 Instructional Feedback video

During weeks 2, 3 and 8 a camera was used to film the entire duration of practice from a high vantage point (Appendix E). Using coach driven performance indicators instructional videos (2-3 minutes) were produced for the coach to observe. Instances that were picked up by the researcher but did not fall under the specific indicators were also included. The footage would initially be imported into SportsCode Elite (Sportstec, Australia) to code and produce the instructional video which was then transferred onto a secure online resource tool (Team Performance Exchange). This was available to view by the coaches only. The videos were also accessible to show during the squad session to the players.

3.2.3 Match analysis

The camera was clipped onto the 'back drop' of the court high enough to record the whole court (Appendix E). Players competed against each other in one set of play. Following the sets the head coach pointed out areas she wished to view again or to make available to the player, in which case clips were produced accordingly. Indicators of performance that stood out to the assistant coaches were then also communicated back to the head coach verbally or through actual footage. Having a set of play recorded for each player also allowed match statistics to be produced if desired.

Table 1. Content of sessions and performance analysis process used

	Focus of Session	**Intervention**
Week 1	Movement	Real-time
Week 2	Movement	Real-time
Week 3	Technical	Real-time and instructional video
Week 4	Decision-making	Instructional Video
Week 5	Decision-making	Match Analysis
Week 6	Decision-making	N/A
Week 7	Decision-making	Real-time
Week 8	Tactical	Real-time
Week 9	Technical	Instructional Video
Week 10	Tactical	Real-time

3.3   Glossary of Terms

Movement- Sessions focused on a players split-step, movement patterns toward the ball and intensity of footwork.

Technical- Aspects of technique looked at included the non-playing arm, ball toss on the serve and slice backhands.

Decision-making- Drills for decision-making were based on shot selection on the run (when to go cross and when to go line).

Tactical- Patterns of play were based around the serve, defending and approaching.

3.4   Procedure

After the 10-week intervention Coaches A and B were interviewed regarding the impact and effectiveness of the overall process. Prior to the interview the coaches were given an information sheet (Appendix A) and a copy of the interview guide (Appendix C). The information sheet reminded participants that anonymity would be kept throughout the study and that they could leave the study at any time without any repercussions. Participants were asked to read and sign a voluntary consent form (Appendix B) confirming their willingness to take part in the study. A Dictaphone was used to record the interview to allow the data to be accurately transcribed and analysed. A pilot interview was also conducted to allow a 'dry run' of the overall process and help address any issues regarding the interview questions (Gratton & Jones, 2004, 2010). This was carried out using a level three tennis coach who had previous experience in using performance within his tennis coaching. It was noted that some questions were irrelevant due to his position as assistant coach. As a result, the interview guides between head coach and assistant coach had to vary slightly depending on their position and influence over the planning and delivery of sessions.

3.5   Interview Design

Suggestions by previous researchers (Groom & Cushion, 2004) helped form the key themes of the interview:

- General usefulness of the interventions
- Importance of player specificity
- Usefulness within the coaching process
- Usefulness within coaching practice

The interview guide was kept consistent for both participants except for questions removed when interviewing Coach B regarding the planning of sessions.

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3.6   Reliability/Trustworthiness

Performance analysis work and studies commonly have reliability issues (O'Donoghue, 2007, 2010). To assess how 'truthful' a piece of research actually is Jones and Gratton (2004) stated that reliability issues must be assessed. Threats to reliability include researcher error from multiple researchers collecting data. However this is extinguished in this study through only one researcher collecting and analysing the data. As anonymity is stressed numerous times subject bias should also be minimal. Yet, as the researcher coaches alongside the participant it increases the risk of subject bias. The participant might not express freely (McKenna & Mutrie, 2003) and attempt to give the 'correct' answers for the study (Gratton & Jones, 2004). The accuracy of the data will be high as the interview is recorded (Patton, 1990). This also helped the interviewing process through not having to make constant notes. Information regarding body language could then also have attention, helping provide 'important links with the verbal answers when analysing the transcripts' (Allen & Howe, 1998, p283). O'Donoghue (2010) described trustworthiness as the accuracy in which the researcher can portray its participant's attitudes, motives and knowledge. To make sure the interviewees are portrayed fairly member checking was done (Holt & Mitchell, 2006). The transcripts were provided to the interviewees prior to data analysis taking place for accuracy checks. Leading questions in the interview were also avoided to help reduce bias and influence responses (Patton, 2002). Additionally, bias was reduced through the researcher conducting field notes after sessions, acknowledging any beliefs of the researcher that may influence the research (Holt & Mitchell, 2006).

3.7   Field Notes

Including field notes within the data collection allowed the researcher's description of events, actions and thoughts be captured to support later analysis. This triangulation of data allows the phenomenon to be explored through more than one type of data, allowing a more accurate representation of the intervention (Gratton & Jones, 2010). Making constant notes helped overcome human memory recall issues (Laird & Waters, 2008). Some notes were recorded during the squad

session however being an assistant coach made it difficult to find enough time to go into great detail. Notes were therefore expanded post session to include more detail and then kept in chronological order.

3.8 Data Analysis

To efficiently analyse data Gratton and Jones (2004) recommended certain stages that could be carried out. After transcribing the interviews all irrelevant data was removed to help organise the data. This data reduction process was also used with the field notes. The next process as outlined by Gratton and Jones (2010) was to display the remaining data that allowed the researcher to help understand and explain the data. To do this the data was coded into themes developed from a deductive and inductive approach. The themes that emerged from the transcripts and field notes were a mixture of those outlined in the interview guide, on top of new themes that emerged from reading and making sense of the transcripts/field notes. Throughout the process notes were constantly made to help keep track of the data. The final but on-going process was to develop ideas through analysing the data and verify its validity through analysing further data that had been collected. The conclusion developed throughout by looking into emergent patterns and attempting to explain them through making sense of the data.

CHAPTER FOUR

RESULTS/DISCUSSION

CHAPTER FOUR: RESULTS/DISCUSSION

4.0   Overview

The purpose of the current study was to evaluate a performance analysis intervention within a tennis 'performance' squad. The underlying questions to evaluate the 10-week period concerned the perceived effectiveness, implementation and how integral it was to the coaching process. The findings will be linked back to previous research to help explain and interpret trends and emergent patterns. Data from the field notes and interviews will be used collectively to help qualify the results.

Themes picked out from analysing the data include feedback, performance and coaching practice. It was highlighted that the feedback given by coaches altered following the inclusion of performance analysis processes in relation to timing, delivery, objectivity and amount. During both interviews it was noted how the intervention had a positive impact on a selection of players but no impact at all on others. Additionally the intervention was found to change coaching practice in terms of the structure of sessions. This type of data is new to performance analysis literature through looking at one coaching set-up from different perspectives however difficult to generalise to other set-ups.

4.1   Feedback

The observations and comments within the present study support previous research (Franks et al., 2001; Hughes & Bartlett, 2008) that stated performance analysis allows for more objective data.

> *'You have something black and white to show them and it can be very powerful in explaining' (Coach A).*

> *'You can show them something positive rather than just telling them that it was positive' (Coach B).*

The ability to reinforce information with the use of objective feedback brought many positives. Firstly, Coach A referred to it as *'holding up a mirror'* when Player A was shown his performance from a match. There was an obvious difference in how the player perceived he had competed yet the footage told a different story resulting in the player becoming upset with himself. It has been noted that this profiling process is of particular value (Butler 1996; Butterworth et al., 2012) and can increase a player's understanding on how to improve. Additionally, Coach B pointed out that the footage was *'educating the coaches on what their players are actually doing'* showing that it isn't just the player's perception of performance that is subject to inaccuracy. Also supported by Coach A- *'it helped identify kind of technical things that I wouldn't have seen if it hadn't have been slowed down'.* As an observer you tend to follow the path of the ball, which can lead to coaches miss or misinterpreting key instances (Hughes & Franks, 2004). The intervention recorded footage revealed instances away from the ball (poor recovery position) that all coaches had failed to notice. This highlighted the difficulties with subjective observations, even when watching just one player within a relatively small arena. With six players over three courts it was found that Coach A had to ask for feedback from the players on their performance as occasionally she could only observe small parts. With augmented feedback paramount to improving performance (Franks, 1997; Magill, 2004) this shows the difficulty of providing accurate feedback within squad situations without the use of performance analysis.

A key finding from the study was the positive influence of having tennis coaches also taking the analyst role. Many analysts within sport are very proficient on software but do not possess the coaching backgrounds Coach B and C had. Using ipads within the session and feeding back to players individually allowed coaches (B and C) to diagnose problems using more objective data and increase the amount of feedback the players received previously. The coach and analyst roles are often separate with feedback from an analyst having to go through a coach before the players. The real-time interventions of this study differed and found that a coach/analyst role allowed the desired ability of feeding back closer to the actual performance (Hastie & Hannan, 1990; Kormelink & Seeverns 2003) and more specific to the player. This approach also included the player within the

performance analysis process contradicting the 'general' approach found by Bampouras et al. (2012).

> '*I think it would be impossible to do what we've just done. It needed somebody who was a tennis player or tennis coach to be able to understand the themes that I was trying to get across*' (Coach A).

Expanding on the work of French and Raven (1959) and Bourdieu (1977) the responses of the coaches indicated how as a coach they could manipulate performance analysis to increase their 'power' and 'capital' over the players when coaching. Although all coaches were qualified with many years tennis experience Coach B highlighted that occasionally players did not 'agree' or 'appreciate' the feedback they were given. Agreeing with the findings of Groom et al. (2011) the participant's respect and perception of coaches influenced whether learning occurs with feedback. However the ability to provide feedback that is then objectively backed up by footage, either instantly or post practice was found to increase the cultural capital and expert power of a coach. Thus cementing their status as coach:

> '*They (the players) think that because they've missed a shot they (the coaches) are just going to pick something random (when feeding back). So for them to actually see that they're doing it wrong that's certainly a massive help*' (Coach B).

> '*…towards the end of the intervention they are listening to us a lot more now when we have the video*' (Coach B).

Such as the coach-athlete relationship is imperative within the coaching process to maximise potential (Cassidy, Jones & Potrac, 2004) this study found the same theory should be applied to a coach-analyst relationship. Firstly, as Hughes and Franks (2004) stated the clarity of operational definitions are associated with data gathering reliability. Discussions often took place between all three coaches in an attempt to overcome the reliability issues in relation to the videos that would be fed back to the players or the head coach herself. This time discussing proved to

be influential in making the process less of a burden on the head coach: *'It would have been too labour intensive for me if you didn't know what you were doing'* (Coach A). With certain performance indicators there will always be a degree of subjectivity. However, the gains of having a coach undertake the analysis was evident through a mutual understanding of indicators already in place.

> *'Because you have a good understanding of the tactical things we were getting across you were very good at picking out the right clips to show them and then speak with them through the clips'* (Coach A).

It was further evident that communication is vital between parties when implementing performance analysis into the coaching process: On one occasion Coach A pointed out the video produced contained too much negative content for a particular player. The player was low on confidence making a negative video very inappropriate. The individual (Coach C) who produced the video assumed that the head coach would view it prior to showing the player, or use it with the intention of planning future drills/sessions around the clip. Better communication between both parties would have avoided the situation Again, such as communication is key to a successful coach-player relationship (Jowett & Ntoumanis, 2004) arguably it should also be applied to a coach-analyst relationship.

Although the six players were part of one squad the influences of their tennis programme outside of the squad had a direct effect on their ability to utilise the potential of performance analysis. For players with less exposure to the head coach outside of this squad it was found that the performance analysis had less impact: *he (Player C) has got another coach that isn't picking up the same things that we're picking up, and that's not then being reinforced so no improvements are being made* (Coach A). Attempts were made to make the external coaches aware of what the performance analysis brought up, yet the coaches did not 'buy' into the process. Coach A suggested that although there was concrete evidence on what he (Player C) is doing wrong and the player understood it, it was not utilised. This is contrasted with the effect performance analysis had on players with consistent access to the coaches who were involved within the process:

'The players that I'm seeing more and been more of consistent feedback through the week and then the intervention comes in again are the players its worked best with' (Coach A).

Augmented feedback can allow learning to occur at a quicker rate, however conflicting and lack of augmented feedback is less likely to have a positive effect (Magill, 2004). The selection of participants within the study made this situation difficult to avoid as players were coached by a number of different individuals at different centres. The implication of the coaches' comments suggest performance analysis could be more effective within a bigger tennis set-up, where players have only one coach and train at the same centre. Thus, providing some reasoning on why performance analysis is not utilised in tennis in a similar manner to sports such as rugby, hockey and football. The inclusion of performance analysis is more prominent in those sports form a lower level whereas only the 'Elite' crop of tennis players has access to analysis or analysts.

Throughout the intervention it was observed that the overall amount of feedback during sessions noticeably increased when performance analysis processes were being used. Magill (2004) argued that individuals could become complacent on feedback, with feedback being given 100% of the time potentially have a negative impact on performance. It was noticed that when coach B or C had video recording software (ipad or handheld camera) the urge was to feedback after the majority of clips recorded, without taking into account the possibility of over-loading the players with information. Even though it was mentioned that performance analysis should be optional and used when needed, within practice it showed the danger of having this tool to assist feedback where coaches could have felt under pressure to utilise the analysis software and be feeding back for the sake of it.

Supporting the work of Groom and Cushion (2005) the content and timing was also found to be important when feeding back. It was highlighted by Coach A how the standard of some players made it more difficult to balance the feedback. Groom and Cushion (2005) stated the negative to positive ratio of feedback should be 1:1 yet within the intervention it proved difficult to abide by the unwritten

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rule: '*Sometimes it can come across as negative that you're always finding faults with them' (*Coach A). As suggested earlier, the inclusion of performance analysis does not automatically lead to improvement, or should be relied upon. The art of performance analysis was found to be picking out the correct clips for the specific player with individualistic information and coaching knowledge to complement the footage. When these aspects were addressed the potential of performance analysis was evident:

'*…they immediately think, oh yeah that's what I was doing, that's why it's going there' (Coach A).*

'*…then all of a sudden it kind of clicked for them' (Coach B).*

4.2   Impact on Performance

No research has yet proven conclusively that the application of performance analysis has lead to a significant improvement in performance (Butterworth et al., 2012). However, observations from the field notes support the positive impact performance analysis had on performance with a number of the players. During the interviews both coaches also mentioned observable improvements in selected players:

'*There was a definite difference between the first match that he (Player A) played and then the second, third and I think fourth match' (Coach A).*

'*I asked him (player A) to tell me when he thought he had played his best tennis in the last few weeks and he said when we were doing that match analysis, the particular match after we had done the match analysis'* (Coach A).

'*…all of a sudden he (player C) pays real attention…his tie break just completely turns around the next time he plays one'* (Coach B).

Previous research (Williams 1999; Butterworth et al., 2012) implied that the maturity level and learning style of an individual affected a coach's decision on how much analysis would be used on players. This notion is further supported by this study through the type of players that were positively influenced most by the intervention: *'The older ones like player C for example really pays attention' (Coach B). 'He (player A) laps up the attention, having people around him, showing him, helping him'* (Coach A). Contrastingly, the study has also brought about an insight into the barriers that can exist when performance analysis is adopted when used with a young population. It was suggested that player B didn't 'buy' into the process due to an influence by his father on the style of tennis he should be adopting. 'Third party' members have previously been found to affect the quality of the coach-athlete relationship (Baxter & Widenmann, 1993; Burger & Milardo, 1995). With further work indicating that parents of young athletes are often seen as role models and significant influencers (Bloom, 1985) these implications within the coaching process support the thoughts (Hughes & Franks, 2004; Carling et al., 2005) that the process is not an unproblematic shift in performance, especially when a young population is involved. However as Jones (2006) has pointed out the coaching process models do not take the social interactions into account, with results from this study implying that the coach-parent-player relationship should also be included.

While Player D tried using the feedback provided he did not possess the physical or technical capacity to achieve significant improvements: *'we haven't had enough time to make those technical changes so we won't yet have seen the results from that initial intervention'* (Coach A). Previous studies (Guadagnoli, Holcomb & Davis, 2002) carried out using performance analysis stated that viewing performance or technique would not automatically lead to improvements. However over the 10 weeks, certain traits that are suggested to lead to improvement were observed within the group:

> *'Players could see their peers doing it well or better than them which seemed to motivate them to try harder and get it right' (Coach A).*

> *'…more confidence in their whole training setup with the knowledge that they have that video support system' (Coach B).*

Literature in confidence (Vealey, Hayashi, Garner-Holma & Giacobbi, 1998; Jones & Hanton, 2001; Vealey, 2001) and motivation (Örücü & Camgöz, 2009) suggested that these traits are the 'foundation' of sports performance and are some of the most influential aspects affecting performance. This also highlighted how every individual will be affected by performance analysis differently through the habitus that they bring to the 'field'. It was suggested that the flexibility of how to utilise performance analysis could care for the different and ever-changing habitus of individuals. Supported by Jenkins et al. (2007) who found that quantitative and qualitative analysis when used in a complimentary manner could be more effective:

> *'Player B, he's quite a stats kind of man, he likes numbers…he couldn't buy into it just from seeing he's missed one because in his head he's made more than he's missed' (Coach A).*

As Groom and Cushion (2005) found within their study, the learning styles of participants varied between visual, auditory and tactile. Within this study both coaches acknowledged that as time went on the performance analysis processes became suited more to the personalities/maturity and learning styles of the players. Understanding the most effective way to get the messages through to the players was influential in becoming more efficient with the intervention. As Coach A pointed out '*this idea of when you're using performance analysis you get to know your player a bit more*', supported by how over time she noticed '*a marked difference between their abilities to take on information*'. Through constant subconscious reflection in action the coaches were able to recognise what practice was ineffective and turn this into 'learning and experience' (Mackintosh, 1998). This process is shown from comparing how at the beginning of the intervention the feedback was given as a whole group using the screen on court. However, constant reflection allowed coaches to cater for the varied personality, ages, maturity, ability and habitus of the players. At the end of the intervention

coaches differed how they utilised real-time analysis: *'Coach B giving feedback to two players using video footage but using a discussion with another player on the basis of the player's different maturity level'* (Field notes).

4.3   Impact on coaching practice

The coaches highlighted that the initial provision of performance analysis caused sessions to become 'stop/start' and 'unstructured' in comparison to the prior 'fluid' sessions. In week two of the intervention the coaches and players accumulated over 20 minutes at the screen together within a two-hour session. This situation arose as performance analysis was used scarcely prior to the intervention and therefore 'had to be fitted in some way' to the coaching process (Coach B). This showed the difficulties faced when implementing performance analysis into the coaching process for the first time, especially without an experienced analyst. Literature on performance analysis within coaching has tended to look into the effects of lapsed-time feedback (Murray et al., 1998; Groom & Cushion, 2005), which does not face this problem. However, in supporting previous literature (Moon, 1999) the ability to reflect allowed the coaches to consider the process in more detail, which lead to a positive change:

> *'I think it's just from trial and error of us using it with them that we get to know after 10 weeks. We made quite big steps in how we are using it, how successful we are using it, just from 10 weeks'* (Coach A).

> *'I've found myself completely forgetting about any performance analysis that goes on in the sessions for the following couple of days and then reflecting. I think that's helped the way that we input the performance analysis into the squad…we've seen the way the structure of the sessions originally changed and now gone back to normal'* (Coach B).

A common theme that emerged from both coaches was the inclusion of performance analysis becoming more efficient within sessions as time went on. Although Coach B deemed planning to be 'massive in terms of the effectiveness' of the intervention, it was the lack of planning which brought about better efficiency. '*I don't plan each session individually or each drill individually. I make it up as we go along with the sessions*' (Coach A). Surprisingly, this approach allowed for the flexibility during the sessions to mould drills around the performance analysis and help fit it into the coaching process. '*I thought what we tried to do as we went on is set them up in an exercise but bring them off individually so didn't have to spend too long*' (Coach A). This mind set, along with the coaching knowledge/experience to introduce suitable drills allowed performance analysis to be integrated easier into the coaching process. Wright et al. (2012) found that majority of coaches used the information from performance analysis to plan short, medium and long-term plans. Yet this study suggests that the practicalities of performance analysis can also effect a coach's planning, mainly in the short-term. In this case, fitting the analysis in without disrupting the session for long periods and having a detrimental effect.

Coach A found the intervention most effective when it was being used on an ad-hock basis: '*I just used you (as analysts) as and when I wanted to*'. This coaching philosophy matched almost half of the participants used by Wright et al. (2012) that 'gut instincts' were dependent on with the use of analysis. As Coach A was the head coach it was suited to her preferences whereas coach B suggested '*a little bit more of a plan in terms of when the analysis would come during the session*' would have been more helpful. These contrasting views show that the way performance analysis was utilised within this set-up worked for this head coach and her style of doing things yet might not suit different coaches with varied styles. For example the other half of Wright et al. (2012)'s participants, coaching philosophy has been suggested to play a vital role in the delivery of performance analysis (Clarke, 2012). The utilisation of performance analysis was found to also differ between group sessions and individual sessions:

'…the nature of me being on my own I'd only really used it looking at player's serve because it's the only time I could video it. I can't video it while I'm playing' (Coach A).

'*With groups the coach doesn't have to be hitting so they can find themselves using the camera…with an individual you would have to have a hitter come in while you video or have someone else doing the video stuff'* (Coach B).

These comments have shown a significant barrier to using performance analysis within some individual sports and help explain its limited usage in comparison to team sports such as hockey, football and rugby. With more people to observe in team sports it's not surprising that the lapsed time analysis was less desired within this study. Wright et al. (2012) found that the majority of coaches surveyed spend 1-3 hours following a performance to review the data, however Coach A found this aspect least useful. Even though six players were often needed to observe over three courts the standard of players made the analysis process easier for the coach: *'their mistakes are so obvious I don't need it slowed down or, it tagged to tell me what somebody's doing on the court, I can see'* (Coach A). Lapsed time videos were seen as a useful tool for the coach if she was away and couldn't view the session. Thus, supporting the notion that performance analysis should be an '*option instead of it being compulsory'* as mentioned by Coach B. The academy used within this study has also revealed the reality of some coaching environments where time pressure is a barrier for some aspects of performance analysis as acknowledged by Gasston (2004). Coach A being in charge of several other squads during the week on top of individual coaching affected her ability to view the clips: '*purely from a time pressure of then going away and watching it outside of the time allocated to those players in a way'*.

Both coaches interviewed expressed their desire to include performance analysis within coaching courses. However, for coach education in individual sports to match those of team sports (Hockey Coaching UK, 2008; Rugby Football League, 2011) there would need to be additional modules as mentioned by Coach B on skills such as setting up a camera. This notion is in tandem with previous research

(Groom & Cushion, 2004; Butterworth et al., 2012) that performance analysis can enhance coach development and increase a coaches portfolio; providing further justification for more inclusion of performance analysis within coaching courses.

4.4   Limitations/Further Research

The primary limitation of the study is the duration of the intervention being too short to allow a full representation of how performance analysis fits within a tennis squad. Additionally, out of the six players who formed the squad it was rare for all six to be present on the same squad. With one week of the 10 containing no analysis and three different interventions within the study then any sessions missed could have affected a player's performance. As a result, impacting on the coaches' perception of performance analysis as a tool. Conducting an intervention using a full-time tennis academy would help resolve this problem. Additionally the players would be subject to just one coach instead of several as in the case with two players in this study (Appendix D).

Comments made by the coaches regarding the player's perception on matters were subjective. A more accurate reflection of the intervention could have been possible through getting the player's view on the processes. Reliability is a common issue in all performance analysis work (O'Donoghue, 2007). Within this study a degree of subjectivity also existed when analysis was presented to the head coach based on the aspects of play she asked specifically to view. Involving the player within the decision making process is also recommended (Kormelink & Seevernes, 2003).

This study was focused around three strands of performance analysis, however comments from the coaches implied how other types of intervention could have been looked into. With one of the players coming across as a 'stats' person a quantitative intervention could be looked into, either to complement video footage or through hand notations. In conjunction with Groom and Cushion (2005), conducting a VARK questionnaire would allow the delivery of feedback be more specific to each player through knowing their preferred learning style. However

within a squad of players it would be unlikely to cater all players' needs in terms of learning styles without additional coaches or analysts.

CHAPTER FIVE

CONCLUSION

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5.0   Conclusion

The present study utilised qualitative research methods to evaluate a performance analysis intervention within the coaching practice of 'performance' tennis coaches. With a dearth of qualitative research exploring the implementation and impact of performance analysis, the research has been successful in assessing its use as a sports science support mechanism. Furthermore, the study supports others in identifying the coaching process as a complex entity.

Being a new entity in the stable coaching practice of the head coach, difficulties were seen in the early stages of implementation, where sessions   become unstructured and less time-efficient. The key to utilising performance analysis processes was found to be a mixture of trial and error with continuous reflections 'in' action (Moon, 1999). It was also discovered that the effects of having a coach undertake the role of analyst had a positive impact on the data produced and the overall feedback process. During sessions the feedback could be given without involving the head coach and also encouraged an individualistic approach with information more specific to players. The overall findings of the study agreed with past literature (Schmidt, 1975; Groom & Cushion, 2005; Jenkins et al., 2007) that the effect of feedback is significantly influenced by its timing, delivery, content and the amount given. The age group used also allowed the study to highlight how maturity, personality, technical ability and influences from parents effected how feedback was received and used.

One of the gaps in literature this study attempted to fill was looking into the optimal use of data within the coaching process (Williams, 1999; Liebermann, Katz, Hughes, Bartlett, McClements & Franks, 2002; Stratton et al., 2004). In short, the comments made by the coaches and reactions of the players suggest that there is not one optimal way. The coaching process models assume an unproblematic shift in performance (Cushion et al., 2006) yet for this intervention to be successful it had to be shaped around the habitus of all individuals and fitted into coaching practice. The manipulation of performance analysis processes within this

intervention worked for this set-up yet is unlikely to have the desired effect elsewhere suggesting the coaching process models should be updated (Butterworth et al., 2012).

The justification of including performance analysis within the coaching process was supported through the positive impact on some players' performance and enabling coaches to use objective data to help analyse aspects of play. All coaches agreed it should form part of future coaching courses as an additional tool to utilise whenever necessary.

Whilst this study exceeded the amount of processes investigated by Butterworth et al. (2012) further studies could alternatively look into the effects of different performance analysis processes. It was also noted that the intervention was less useful for players who train at multiple centres with a number of different coaches giving support for future research to look at players within full-time academies.

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APPENDICES

APPENDIX A

PAPRTICIPANT INFORMATION SHEET

Participant Information Sheet

Please read all of the information below before signing the consent form.

The purpose of this document is to assist you in making an _informed_ decision about whether you wish to be included in the project, and to promote transparency in the research process.

1) Background and aims of the research

Performance analysis gives coaches the opportunity to recollect important factors that influences practice/matches which might otherwise be missed. Feedback given to athletes earlier in their learning process has also found to be beneficial. I wish to see the impact performance analysis had from the 10-week intervention.

2) Benefits of taking part:

The study will increase the understanding of how effective performance analysis is within the coaching process with a young population.

3) How data will be collected:

Through conducting a focus group more information can be gathered than using quantitative measures. The focus group will approximately last 30 minutes. What is said during the focus group will be transcribed and key information taken out to keep confidentiality of yourself and other members of the study.

Your rights

Your right as a _voluntary_ participant is that you are free to enter or withdraw from the study at any time. This simply means that you are in full control of the part you play in informing the research, and what _anonymous_ information is used in its final reporting.

Protection to privacy

Concerted efforts will be made to hide your identity in any written transcripts, notes, and associated documentation that inform the research and its findings. Furthermore, any personal information about you will remain *confidential* according to the guidelines of the Data Protection Act (1998).

Contact

If you require any further details, or have any outstanding queries, feel free to contact me on the details printed below.

Mathew James

Tel no: 07950234906

E: st10001651@outlook.uwic.ac.uk

APPENDIX B

VOLUNTARY CONSENT FORM

VOLUNTARY CONSENT FORM

Title of Project: Evaluation of a performance analysis intervention within a youth tennis squad.

Name of Researcher: Mathew James

Parent to complete this section: **Please initial each box.**

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

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

3. I give permission for my answers from the focus group to be included within the study.

4. I understand that the information from the study may be used for reporting purposes, but I will not be identified.

5. I agree to participate within this study.

Name:…………………………………………………Date………………

Signature:……………………………………….……..Date………………

Name of person taking consent:………………….…….Date……………….

Signature of person taking consent:………………….…..Date……………….

APPENDIX C

EXAMPLE INTERVIEW GUIDE

EXAMPLE INTERVIEW GUIDE

1. General usefulness of the analysis
2. Importance of player specificity
3. Usefulness within the coaching process
4. Usefulness within coaching practice (plus multi-discipline)

Background

- Could you firstly give an overview of your tennis background.

Probe: For example how much did you play before you got into coaching?
Probe: Also how much experience in coaching do you have?

- How would you describe your general coaching style?

Probe: Visual, auditory and kinaesthetic.
Probe: Is it a mixture of two or possibly all three?

- Prior to the intervention how much knowledge on the concept of performance analysis did you have?

- Were you exposed to any performance analysis when you were coached yourself?

- Before the intervention how much PA was used if any within your coaching practice?

General Usefulness

- Firstly how helpful did you find the three different interventions for yourself as the coach?

- Are there specific parts that you found most helpful?

Probe: Did you find one intervention more useful than the others?

- Were they useful in different situations?

- Was there any part of the intervention that you didn't find helpful or effective?

- Do you think the performance of any of the players changed as a result of the interventions?

Probe: Did any of the players noticeably improve overall or in a particular area?

Player Specificity

- Overall, how do you think the players perceived the performance analysis?

- Do you feel the analysis had an effect on some people more than others?

Probe- How could you tell (Performance, reactions, comments)?

- What do you think the main reasons were for this?

Probe- Level of players? Age of players? Personality?

- You gave different performance indicators for different players. Did you find the instructional videos and TPE more helpful than trying to observe these during sessions?

How PA impacted on coaching practice

- How did the intervention affect planning of sessions if at all? (short term, long term planning?).

- During Sessions? (time spent on it), help deliver theories, demonstrations

- Could time spent using PA (at the screen for example) have been more efficiently used without PA?

- Do you feel performance analysis would have been utilised better during individual sessions or squads of less players?

- How did your feedback differ from before the intervention?

Probe: For example became more positive/negative? More detailed?

Coach Process

- Did you reflect on coaching sessions differently after performance analysis was used?

Probe- Did you reflect more after analysis? Use the online resource?

- How important do you think the relationship between coach and analyst is for the analysis to work?

Probe- Was it important that analyst and coach were on the same page?

- Was the timing of feedback important? (instructional videos taking a week for example).

Probe- Did information given on the previous week's squad have less impact than it could have been with real-time feedback.

- Do you feel that PA had an impact on other disciplines within coaching? (psychology, strength and conditioning, bio-mechanics, physiology).

- Do you feel that the inclusion of performance analysis should be within the coaching process?

- Did you feel this before the intervention?

- During week 5 you did not want analysis done, what were the reasons for this?

Future of Performance Analysis

- How could the overall process have been improved?

- Would you include more performance analysis within coach education courses and workshops for current and future generations of coaches?

- What do you perceive as the main barriers to having performance analysis as a key element within the coaching process?

- Have you learnt anything out of the process?

APPENDIX D
PLAYER INFORMATION

PLAYER INFORMATION

D-1

	Gender	Age	Tennis Rating	Weekly Tennis-Number of Coaches
Player A	M	11	6.2	12 hours- 2 coaches
Player B	M	10	8.1	8.5 hours-4 coaches
Player C	M	12	7.2	11 hours- 4 coaches
Player D	M	11	6.2	10.5 hours- 3 coaches
Player E	M	11	7.2	10 hours- 4 coaches
Player F	M	12	7.2	7 hours- 5 coaches

APPENDIX E

COURT VIEW EXAMPLE

COURT VIEW

E-1