Cardiff School of Sport

DISSERTATION ASSESSMENT PROFORMA:
Empirical

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**Dissertation title:** Evaluation of a performance analysis provision with collegiate athletes and coaches using an online platform.

**Supervisor:** Adam Cullinane

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|          | 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 (25%)** |
|          | 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 (15%)** |
|          | To include: details of the research design and justification for the methods |

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1 This form should be used for both quantitative and qualitative dissertations. The descriptors associated with both quantitative and qualitative dissertations should be referred to by both students and markers.
applied; participant details; comprehensive replicable protocol.

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² There is scope within qualitative dissertations for the RESULTS and DISCUSSION sections to be presented as a combined section followed by an appropriate CONCLUSION. The mark distribution and criteria across these two sections should be aggregated in those circumstances.
EVALUATION OF A PERFORMANCE ANALYSIS PROVISION WITH COLLEGIATE ATHLETES AND COACHES USING AN ONLINE PLATFORM (PERFORMANCE ANALYSIS)

SAMUEL CHARLIE MINCHER
ST20000755
EVALUATION OF A PERFORMANCE ANALYSIS PROVISION WITH COLLEGIATE ATHLETES AND COACHES USING AN ONLINE PLATFORM
Cardiff Metropolitan University
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Acknowledgements

I would like to thank my dissertation supervisor, Adam Cullinane for his constant support throughout the research process, as he provided me with the necessary balance between guidance and independent study. I would also like to thank my parents, for their crucial emotional and financial support, without whom I wouldn’t have enjoyed such a successful university experience.
Abstract

Previous research in performance analysis has been dominated by studies quantifying sporting performance, in an attempt to understand what variables are necessary, with a focus on facilitating a successful outcome for individuals or teams. Within the discipline, there has been little research undertaken from a qualitative perspective, gaining a range of opinions on the application of feedback with emphasis on how valuable individuals believe performance analysis to be in athlete development and team improvement. This highlighted the need for a ‘real life’ study to be carried out, with the intent of producing useable and valuable findings. In an attempt to increase knowledge in an applicable sense, the aim of the current study was to undertake a comprehensive, detailed assessment of the usefulness of a performance analysis provision at Cardiff Met Sport with a range of teams through the use of an online platform. The study utilised a mixed-method approach through online observations, questionnaires and semi-structured interviews. The purpose of such a broad data collection process was to ensure a range of roles and teams were studied or order to provide an accurate representation of the platform as a whole. The results found a range of different findings by comparing similarities and differences with coach, athlete and analyst viewpoints. It was found that the platform was an acceptable replacement for face-to-face feedback when necessary, acted as a useful organisational and communication tool for some teams whereas others hadn’t engaged in it fully due to a lack of experience and training. Reasons for engagement varied depending on the team and were discussed suitably. The study provided usable findings related to which of the platform’s functions were seen as strengths by the participants and which functions needed to be improved.
Chapter I
Introduction
Introduction

Although academic researchers have encountered difficulties providing an accurate definition of performance analysis, it has become an accepted mechanism of feedback because of its unarguable ability to support performance with quantitative support. Issues in definitively positioning the discipline have arisen due to its encompassing nature in practice. This is especially relevant when discussing its relationship with notational analysis and biomechanics (Bartlett, 2001; Glazier, 2010), as there is a tendency for performance analysis processes to border and often overlap with the aforementioned disciplines. O’Donoghue (2010) argues that all research concerned with actual sports performance can be labelled as performance analysis. This can be attributed to its ability to provide an understanding of sport using data collected within a performance or training environment, with the purpose of informing those who are seeking to enhance performance. Differing definitions are unsurprising because of the rapid growth of the discipline and its swift introduction to the sporting industry.

There is a plethora of research studying the coach-athlete relationship, but since the emergence of a performance analyst as a recognised position within a sporting organisation, there exists little literature critically examining coach’s perceptions of their newly formed responsibilities alongside their traditional practices. Furthermore, the athlete’s perceptions are unrecognised because of their position as the ‘object’ and ‘receiver’ of performance analysis (Bampouras, Cronin and Miller, 2012). This has led to a lack of literature identifying how coaches interact with the discipline (Wright, Atkins and Jones, 2012) and further indicated the necessity for research investigating how performance analysis impacts on the learner.

There is a gap in the literature studying the effects of a performance analysis provision on all the stakeholders; there is a clear requirement for applied research due to sporting environment’s social realities (Carling et al. 2013). As highlighted by
Mackenzie and Cushion (2014), performance analysis is an applied field by nature and therefore demands applied qualitative research to suitable explore the undoubted intricacies present within sporting performance. An applied approach is likely to provide a detailed understanding of the discipline as a tool for learning and the impact this has upon professional practice, whilst widening the somewhat limited research base at present (Mackenzie and Cushion, 2013).

The purpose of this study was to critically assess the current performance analysis provision at Cardiff Met Sport through the use of an online platform. There is a hope that the findings will be of use to the university and will support the development of the current provision. The study is very much filling a gap where literature has identified a requirement for such work to be carried out; there are likely to be novel findings. Although this can be viewed as advantageous, there are clear limitations to the study. As there is no previous research to aid in hypothesising prior to the study, difficulties are likely to be found in the application of findings to other performance analysis provisions due to the applied nature of the research.
CHAPTER II

REVIEW OF LITERATURE
2.0 Feedback in sport and its application in the coaching process

Feedback has long been viewed as a necessity in improving knowledge and skill acquisition (Shute, 2008). There has been a vast amount of research into the different types that exist, especially within sport and athletic performance. Feedback interventions within team sport can yield a large and positive effect on performance (Kluger and DeNisi, 1996) and have a dual purpose; improving and supplementing long-term individual player development and learning, as well as aiding short-term team performance and long-term team development. It is believed that extrinsic information accelerates the learning process and is necessary for an athlete to reach maximal performance levels (Maslovat and Franks, 2007).

Research has been conducted into whether more benefit can be gained from intrinsic or extrinsic feedback (Wulf et al., 2002). In the findings, it was stated that feedback was more effective when attention was drawn away from the performers' bodily movement. This was apparent because the learner becomes too dependent on informational support (Franks, Hodges and More, 2001; Wulf et al., 2002). It is unlikely that similar theory can be adapted for learning complex and detailed performance aspects with skilled performers. It is suggested that skilled performers will benefit most from video feedback of their performance whereas novices are likely to require further verbal information in order to identify key points (Lawrence, Kingston and Gottwald, 2013). Other research argues that feedback processes alone will make athletes more analytical and focussed in their approach through self-analysis and change (Murray and Hughes, 2001).

Consideration should be given to the timing and frequency of feedback when striving for optimum improvement. Even though learning can only be assessed at a later time period, feedback immediately after a movement may force the learner to depend on extrinsic feedback and discourage the learner from being actively involved in their own intrinsic error detection process (Hodges and Franks, 2007; Miller, Oldham and
Donovan, 2011). Similarly, research shows that providing feedback too soon is likely to encourage over-correction of performance (Hodges and Franks, 2007) and over-exposure to too much information is likely to interfere with the next performance (Liebermann et al., 2002); it is more effective to delay and provide limited yet specific feedback.

Liebermann et al. (2002) discussed how feedback systems supplemented by technology can enhance skill acquisition and sport performance, critically evaluating its usefulness to athletes and coaches. It was concluded that the discovery of information technology in sport is a positive, yet not always essential step towards achieving effective learning through the delivery of feedback. This is because it allows an athlete to compare their expected optimum performance with the actual recorded outcome. IT is vital for motor learning through both simple and complex videos and simulators and should be seriously considered for use in practice (Liebermann et al., 2002). This study is now relatively outdated and technological advancements may produce different results if the study was repeated. Studies looking at the effectiveness of feedback are complicated as many variables exist within sports performance are impossible to control (O'Donoghue, 2006).
2.1 What is performance analysis?

The position of performance analysis has long been argued within the academic world. It has previously been labelled as a ‘marriage of convenience’ between applied biomechanics and notational analysis (Glazier, 2010). In comparison, it has also been described as a synergy between the two aspects, providing something more than the two disciplines would separately (Bartlett, 2001). Carling et al. (2013) concluded that performance analysis lacks a clear definition at present, as it spans disciplines as well as providing a sub-process for coaching. One of the first examples of performance analysis’ benefits can be found through the success of the Norwegian national football team. Interactive video feedback was implemented to analyse the team’s patterns of play, resulting in a level of performance which belied the country’s limited resources (Olsen and Larsen, 1997).

Coaching is the main application area of performance analysis (O’Donoghue and Mayes, 2013). PA has become an integral feature surrounding the development of individual and team performances due to its ability to advance understanding of game behaviour (McGarry, 2009). It ties together the concepts of feedback and technology in sport. Over recent years, the inclusion of PA feedback in a regular programme of athlete development has become very popular in order to optimise match performance. Advances in information technology have improved the feedback athletes receive related to their performances in training and competitions (Liebermann et al., 2002). The implementation of video review sessions and feedback into weekly training programmes has led to its acceptance as a valuable aspect of the coaching process (Drust, 2010). McGarry (2009) believed that the most effective way of ensuring these interventions are effective is to highlight critical incidents within previous performances.

PA feedback as a concept has clearly proven to be beneficial but the most effective manner of its delivery to athletes is yet to be fully researched and understood. Comparing subjective and objective views of analysing performance, there has been movement towards the use of quantitative methods and technology, undermining a
coaches subjective observations (Nelson and Groom, 2012). Match analysis processes are seen to assist in the provision of objective information about how an individual has performed in order to aid the coaching process and help facilitate performance. Despite the fact such analysis has proven benefits, it isn’t always implemented by coaches and players due to a range of factors such as time restraints, availability of results and misinterpretation of results; for effective match analysis to take place, ample time and energy much be dedicated before results can be implemented into practice (Carling, Williams and Reilly, 2005). The increasing requirement for analysts to take some responsibility alongside a coach is therefore apparent for one to enhance the other, importantly through effective communication (Barwis, 2013).

There is a lack of literature that locates where PA feedback fits into the coaching process, specifically when and how a coach should best utilise information provided to them by an analyst; little is understood of coach application within the coaching process (Smith & Cushion, 2006). A study looking at coaches’ engagement with PA tools and how analysis impacts on decision-making produced findings about how highly the coach values feedback given to them by analysts, as well as evidencing how coaches and organisations value PA feedback within their coaching process (Wright, Atkins and Jones, 2012). As 93% of the coaches were white males, the studies’ results cannot be relied upon by a large amount of other coaches, including females, effectively taking away from the validity of the study. Work is needed to identify the nature and level of detail of information that is necessary to realistically impact upon training and match preparation in applied settings, through an action-based case-study type approach (Carling et al., 2013).

Further research looking at coaches’ perceptions of the potential use of PA focused on badminton through interviews (Butterworth, Turner and Johnstone, 2012). The results mirrored Wright et al. (2012), showing that PA is a popular and welcomed aspect of the coaching process, with many advantages for both the coach and player (Butterworth, Turner and Johnstone, 2012). Despite this concluding claim, the best assessors of PA are the consumers, as they are the individuals who actually use it
Athletes are consumers yet were not involved in the interviews, therefore their perception on the feedback cannot be defined. The coaches may be gaining knowledge from the information they receive from the analyst, but the athlete’s insights are ignored. The place of PA in the coaching process cannot be located if the athletes are not fully involved in the cycle.

A study by Groom and Cushion (2005) did look at feedback from the athlete’s perspective, attempting to understand the most effective way that delivery can be carried out, using U17 football scholars. The findings concluded that learning is stimulated through the use of video feedback, as this tool allows game understanding, recognition of strengths and weaknesses and the ability to develop self-analysis skills (Groom and Cushion, 2005). Furthermore, upon reflection of the video feedback sessions, it was found psychological benefits were achieved when viewing positive clips of performance. Equally, it was also found that clips of negatives aspects of performance could result in a negative impact on confidence (Groom and Cushion, 2005). In relation to this, a study by Mackenzie and Cushion (2013) looked at athletes and coaches perceptions of performance analysis and found a common theme; it was used as a post-performance evaluation tool to clarify their interpretation rather than to learn novel information. This shows how a specific culture within an organisation can have an effect on how performance analysis is utilised, with the potential to vary greatly. Further research should delve deeper into this area, with a range of athletes and coaches to further knowledge in different sports within different cultures. Similarly to that of Lyons (2005) for example, further real-world study is needed.

James (2006) accepted the importance of practicality within performance analysis research and studied coach’s levels of interaction with notational research in soccer using data collaborated with a professional team. It was stated 9 out of 10 English Premier League managers used hand or notational analysis, suggesting its use is widespread. Although its popularity was proven, issues are raised surrounding operational definitions, validity, reliability and a potential lack of statistical training within coaches, taking away from its ability to provide valuable results. James (2006)
goes on to state how PA education within organisations will strengthen the discipline, lead to methodological advances and benefit all prospective analysts.

The location of the athlete, coach and analyst or professional within this complex process is difficult to decipher because of the differences between groups of coaches and athletes, especially age and ability. Case study research carried out by Bampouras, Cronin and Miller (2012) stated how the sport scientist and coach tend to hold a crucial reflexive relationship, whereas the athlete is allowed minimal involvement in the process and is alienated, with the coach acting as the gatekeeper. Conclusions from the study clearly show the limited impact that the athlete has in the process and how their opinion on the situation is often undervalued due to their lack of PA knowledge and experience. Future work should consider the role of the athlete in assisting practitioners when performance analysis systems are applied (Bampouras et al., 2012). One weakness of the study is the limited number of participants, meaning the majority of points made will not be relatable to other sports and individuals. Furthermore, relying on recent research evidencing the differences in learning styles between different athletes and different coaches (Dunn, 2009; Stevens-Smith and Cadorette, 2012), it is difficult to take conclusions from the three participants that can directly be attributed to other athletes and coaches. Literature has proven that feedback will be effective as long as it is relatively simple and has a direct relationship with goal-attainment (Franks, Hodges and More, 2001).
2.2 The role of performance analysis in creating learning environments

Research shows that people process information differently, ranging from visual-spatial, aural-auditory and verbal-linguistic to interpersonal and intrapersonal intelligences (Herndon, 2012). If individual differences between learners can be identified, the learning process can be understood and guided more accurately (Hammond et al., 2001). Once these differences are understood, performance analysis and its distribution to players and athletes has the ability to create strong and effective learning environments. Athletes should be encouraged to communicate their needs in ways that capitalise on their perceived strengths. There exists a strong correlation between understanding an athlete’s learning strengths and their ability to translate athletic ability to the classroom (Dunn, 2013). It is apparent there is a need for research focus on what and how coaches and athletes are learning through the examination of performance analysis information alongside their experiences in competition (Mackenzie and Cushion, 2012).

Groups of athletes and coaches with similar interests can often learn through the presence of others and social participation, also known as a community of practice (COP). With active participant learning, a combination of formal, nonformal and informal learning opportunities within a community of like-minded individuals can be beneficial (Culver and Trudel, 2008). Cobner (2013) suggests there is movement away from the traditional COP in which a group collaborates towards a shared goal, towards a COP in which the individuals work towards differing goals but with a shared environment and shared resources. This translates into the need for a PA environment where individuals can share experiences and knowledge whilst working towards separate goals; it highlights the potential benefit of a three way relationship between athletes, coaches and analysts.

Much is made of the implications of the athlete taking ownership over their performance. Certain research shows how learners who are self-controlled will become more active participants in the learning process (Menickelli, 2004). It has also been claimed that learning targets can only be met if the learner takes some
form of ownership over them (Nichol and Macfarlane-Dick, 2006). This naturally progresses towards the modern principle of flipped learning. This is the concept that challenges the traditional ‘classroom’ learning environment, encouraging the use of videos, slide shows or audio lessons that are flexibly accessible, whilst bridging the gap between the educational stage and the home environment (LaFee, 2013). For years, the educational suggestion is to be lectured to, before completing further study at home. Flipped learning suggests the learner should be responsible for studying the material at home, before arriving prepared for in-depth collaboration and authentic learning (Hoffman, 2013).

Flipped learning in sport follows in the same manner, using electronic methods of delivering information surrounding practice plans, new plays and skills or the analysis of performance, allowing students and athletes more time to master skills during performance (The Flipped Coach, 2013). Issues that arise surrounding this subject originate from a lack of time for professional training, financial backing and technological provision within institutions. Flipped learning requires knowledge of how to organise and present lesson material to optimise interactions (Szafir and Mutlu, 2013). Furthermore, many may find challenges within rapidly changing expectations and a fear of giving up control (Thiele, 2013). Responses to this suggest that the technological solutions do not require expensive complex software, as simple materials using existing equipment will comfortably suffice (LaFee, 2013). Future research in this area will increase understanding of PA in applied contexts and will further examine the ‘analysis-learning-performance link’. (Mckenzie and Cushion, 2012).
2.3 Performance analysis processes

As PA is an ongoing process of development, aimed at ultimately improving sporting performance, it is crucial that an efficient process is in place within an organisation in order to maximise the impact feedback may have. Systems used should be informed by the information needs of the coaching process that the system serves (O'Donoghue and Mayes, 2013). Such processes are difficult to define because of the conflict that can be found between customising PA to the individual environment and comparing global data (Cobner, 2013).

Models exist outlining the various processes that illustrate how a performance analysis system could operate. Franks, Goodman and Miller (1983) created one of the first coaching-orientated PA models; a flow chart of processes which occur as a review of performance, with the coaches evaluation being qualitative and subjective (O'Donoghue and Mayes, 2013). This was followed by another coaching based process created by Winkler (1988), involving systematic observational analysis, evaluation of data and feedback to a squad (O'Donoghue and Mayes, 2013). These early models can be problematic due to inaccurate and unreliable human observations, highlighting the need for a link to video recording (Franks, 1997). This can then be compared to a model developed by Cross and Lyle (1999) which, although similar to Franks et al. (1983) addresses certain software advancements by taking into account analysis during performance. Hughes and Franks (2004) developed a simple schematic diagram which accounts for the location of performance analysis within the coaching process, allowing for preview, review and real-time observation alongside the analysis' impact on practice. Mayes et al (2009) proposed a model that allows for multi-directional information flow, as well as accounting for a detailed provision that can be utilised at elite levels, ensuring players are involved in the process at all times (see figure 1).
Figure 1. Performance analysis in a coaching context (Mayes et al., 2009).

The main issue with many PA models revolves around the fact they are sequential and cyclic, which is not necessarily the true nature of the coaching process (Cushion, 2007) and forces structure and direction upon the user. This is illustrated within literature through the depiction of flow charts and schemas (Mckenzie and Cushion, 2012). More recently, there have been attempts to target this, such as Horne (2013) and a functional model, as seen in figure 2, created by Welsh Netball (O’Donoghue, 2006) which allows for a more dynamic view from an applied perspective. Cushion (2007) questioned why coaching scholars are yet to develop a comprehensive model of coaching thus far and concluded that models and diagrams are two-dimensional and struggle to define the complexity of feedback within coaching; they are attempting to simplify an ambiguous concept (Cushion, Armour and Jones, 2006). With the expansive and rapid growth in performance analysis possibilities, more flexible and vigorous processes are likely to result in a productive solution for the athlete and coach.
Figure 2. A functional model of the analysis process (O'Donoghue, 2006)
2.4 The use of technology in performance analysis

Although many practitioners remain sceptical about technology within the performance analysis discipline (Lieberman and Franks, 2004), it has long been agreed that video is a valuable tool to support the coaching process (Katz, Liebermann and Sorrentino, 2001; Haines, 2013). Performance analysis has utilised the use of video recording and analysis for many years due to its ability to extract detailed objective information (Treadwell, 1987). Advances in technology allow for almost limitless storage, retrieval and analysis of data in real time (Maslovat and Franks, 2007). These advancements have allowed athletes and coaches to become more comfortable when using such technology.

Recently, issues in the PA discipline surrounding communication, geographical location and time-restraints have resulted in the development of online solutions; the use of the internet allows for better use of training time (O'Donoghue and Mayes, 2013). These systems aim to overcome such barriers as they have the potential to provide a central hub for administrative, performance, training, nutritional, medical and educational information for athletes within an organisation (Fair Play AMS, 2013). These computerised systems also allow coaches and athletes to interact at any time through the use of an online platform. One of the main uses for such a system is the sharing and dissemination of performance analysis through video footage and discussion surrounding past performances; it can be used as a learning review tool. Although there remains a lack of literature reviewing such systems, the amount that is possible to achieve through web platform-based solutions is growing and disseminating online information is ever increasing in demand (VPA, 2012). One of the reasons there is not a plethora of research surrounding technology, such as video analysis systems and online athlete management systems, is because of difficulties controlling variables that occur within sports performance. Although many technological advancements are yet to be assessed in detail, the amount of assistance that is available for coaches, should they require it, can only be seen as advantageous.
The Australian Institute of Sport produced a document outlining what they would require from a potential athlete management system (AIS, 2012). The functions included:

- Performance monitoring and tracking
- Automation of athlete profile production, diary and booking functions
- Monitor training information such as attendance, plans, injury data and session data
- Storage of nutrition, medical, biomechanical and physiotherapy information
- Squad functionality
- Secure online user interface accessible on multiple devices by all stakeholders
- Allowing for case notes, analysis and reports

There are a range of commercial online solutions available that offer various functions (see table 1).

Table 1 provides a summary of online file sharing and communication platforms available to consumers. Due to a distinct crossover in the features and functions of many of the platforms and extensive use across industries, examples have been included from sport, education and business. Sport specific platforms can be compared with educational resources such as Blackboard and Moodle which offer file sharing and academic guidance (Moodle, 2013). There are also platforms that exist within both the business work-place and the sports data management industry such as Huddle, which is used by businesses such as Panasonic and Kia, as well as sporting bodies such as British Fencing and British Boxing. Huddle allows secure tailored information transfer and communication within an organisation. Other methods of data sharing exist using the ‘cloud’. This is the relatively new development of splitting and storing resources on the company’s server in order to back-up user data, host shared data, store web applications and serve web pages (Muniswamy-Reddy et al., 2010). This is already being utilised by companies such as Apple and Dropbox.
All the available platforms have scope for an individual identity, specific to the organisation they are being used by. These environments can be password protected with a personalised skin related to the organisation, therefore maintaining the aforementioned community of practice and the benefits that occur with such boundaries. On the other hand, the platforms can be available to the public, such as YouTube and Vimeo, with open access for mass observation and interaction.
Table 1. An audit of a range of sporting, educational and business online management systems and their functionalities.

<table>
<thead>
<tr>
<th>Function</th>
<th>Industry</th>
<th>Sporting</th>
<th>Educational</th>
<th>Edu/Bus</th>
<th>Business</th>
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<tr>
<td>File share - upload and view a range of different files types online</td>
<td>Rank One</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Scheduling/calendar - organise and plan appointments</td>
<td>AMP</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Profiling - create individual profiles that includes custom information</td>
<td>Smartabase</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Grouping - manage individuals in sets that allow for easier team management</td>
<td>Zeus</td>
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<td>✔️</td>
</tr>
<tr>
<td>Injury/Rehab Information - track injury data such as doctors notes and recovery dates</td>
<td>Edge 10</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Note storage - keep important notes on the platform for future reference</td>
<td>TPE</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Report production - generate a range of report outputs that collates data together</td>
<td>Coach Logic</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Engagement data - track who is using the platform, what they are viewing and when</td>
<td>Rugby Squad</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Web app - Purpose build mobile application that allows for on-the-go engagement</td>
<td>Moodle</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Communication - internal email for athletes and coaches to send and receive messages</td>
<td>Blackboard</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Inventory tracker - administrators can track who is in possession of equipment</td>
<td>LORE</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>eFront</td>
<td>Huddle</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Proofhub</td>
<td>Basecamp</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>
calls for an alteration in the direction of PA research, especially surrounding its systematic application within the coaching process. The genuine requirement for research into applied PA practice is twofold: to examine and conceptualise a definition of PA whilst understanding how social issues have the ability to influence learning and practice (Cushion et al., 2013). Variables outside of the researchers control have discouraged investigation into the impact of performance analysis support for athletes (O’Donoghue and Mayes, 2013). Developing new knowledge rather than continuously studying identical variables is likely to further knowledge in a more beneficial fashion (Mackenzie and Cushion, 2012). Applied real world study is needed to research how best feedback should be given in order to improve performance, in turn discovering potential implications for coaching (Bartlett, 2001; Atkinson and Nevill, 2001). There are few studies that are wholly applicable to a real life scenario with the same environmental and contextual constraints as would be expected in practice. Especially with ever-changing technological changes, little research has been completed assessing the use of up-to-date software. It is also important to understand what PA feedback is being delivered, when and how. Therefore, the purpose of this study will be to undertake an assessment of a practical and applicable 'real world' performance analysis provision, which includes a range of sports with a range of coaches using an online platform.
CHAPTER III
METHODOLOGY
3.0 Research design

This study aimed to assess the current PA provision at Cardiff Met Sport through monitoring and assessing the usefulness of an online athlete management platform and its function within a team sport environment. In order to gain a varied viewpoint, the research carried out was mainly qualitative in nature through mixed data sources including field notes/observations, questionnaires, and semi-structured interviews. In addition to this, supplementary quantitative data was also collected during from the questionnaires. Mixed method data collection was chosen because of how qualitative data can clarify and explain quantitative findings (Jayaratne, 1993). The differing data collection methods attempted to gather a wealth of information from a range of participants, with the intention of bringing together viewpoints from contrasting sporting roles and backgrounds.

3.1 Participants

In performance, data is best gathered from a team as it includes a range of perspectives (Hughes, 2004). Participants were used from different sports, with varying roles and responsibilities. Players, coaches, analysts and sports science support staff at Cardiff Met Sport were targeted using the key informant technique because of their ability to provide deeper insight into what is going on around them and their ongoing observation of the development of the culture (Marshall, 1996). The researcher had involvement in a performance analysis provision which allowed for ease of access and communication. Athletes ranged from 18 to 24 years old and were all performing in university competition, either recreationally or at a more elite level, with a small selection having represented their country at youth or student level. The sports included were ladies football, basketball, hockey and rugby and men’s football, hockey and rugby. The analysts and sports science staff provided support to the Cardiff Met teams. The analysts were either undertaking an MSc
programme or in their final year of a BSc programme, specialising in performance analysis.

3.2 Structure

<table>
<thead>
<tr>
<th>October</th>
<th>November</th>
<th>December</th>
<th>January</th>
<th>February</th>
<th>March</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questionnaires</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interviews</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3.** A gauss chart illustrating when research tasks were carried out

The online athlete management platform being assessed was Team Performance Exchange. Team Performance Exchange (TPE) is an online athlete management tool which has the ability to share content, promote communication and create secure sub-teams that can be accessed through a password protected login (Analysis Pro, 2013). TPE had been used by the men’s rugby and men’s football teams for three years, whilst it was the first season for the other five teams. Uses by these teams included viewing performance analysis content, PA presentation, athlete communication and organisation. For this reason, TPE provided a suitable platform for the performance analysis provision to be observed and assessed. An audit of TPE’s functions can be seen in table 3.
Table 3. An audit of Team Performance Exchange’s functionalities
<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>A personalised welcome page which allows team announcements, instructions how to use the site, links to other websites and images, the last 5 files that have been uploaded and the last 3 messages received.</td>
</tr>
<tr>
<td>My Portfolio</td>
<td>Allows for comparison between players statistics, team averages and other data against a norm value. These can be plotted against dates to create graphs. Players can see their own data whereas admin users can compare all. The data is either gathered manually or taken directly from questionlist answers. Portfolio documents lets players use created templates to edit and add text for open ended information. It is possible to discuss these files with admin users who can see all the portfolios and can create them for others.</td>
</tr>
<tr>
<td>My Templates</td>
<td>These are used for document portfolios.</td>
</tr>
<tr>
<td>My Team</td>
<td>A visual database of every player within the team. From here, it is possible for a coach to access their personal information, team information such as position, groups they have been placed in and information related to their activity levels, as well as their last viewed files. Further options can take you to Questionlists and portfolios they have access to. Users can be removed/disabled from here by admin; their data is not lost.</td>
</tr>
<tr>
<td>My Groups</td>
<td>Players and staff are placed in groups using a tickbox or by their age/gender. This can show who should be attending certain sessions or allows certain files to only be viewable by group e.g. midfielders</td>
</tr>
<tr>
<td>My Files</td>
<td>A range of different files can be uploaded (maximum file size of 1gb), downloaded (essential if over 350mb) and viewed online (under 350mb). There is the option for surrounding discussion by everyone who has access. This includes videos, Word and PDF documents, images and presentations. A notification system works with the files to show people they haven’t viewed a file yet or where other comments are found.</td>
</tr>
<tr>
<td>My Analysis</td>
<td>Match and training planning and analysis can be carried out on TPE to either be viewed by users online or presented. This includes visual graphics of pitch layouts and moveable markers to carry out positional analysis. Training drills can be demonstrated and illustrated using a range of pitch layouts, markers and arrows with a text description. The analyses can then be saved and printed as a PDF file if required.</td>
</tr>
<tr>
<td>My Calendar</td>
<td>Anyone can add appointments to a calendar and either invite individuals/groups or keep it private. Admin can see all appointments. Another options allows people to subscribe to the calendar with an app on their iPhone, iPad, Mac or outlook on a computer. Alterations on TPE will automatically update the calendar on these devices. Appointments can also hold a link to a file, questionlist or portfolio in order to easily access data.</td>
</tr>
<tr>
<td>My Messages</td>
<td>Messaging system within TPE, private messages can be sent to individuals, groups or teams.</td>
</tr>
<tr>
<td>My Questionlists</td>
<td>Area for lists of questions to be uploaded. These can be edited to allow for closed, open and scaled questions. They can be made visible for individuals, groups or whole teams. Once answered, reports of answers can be compiled in order to collect results. This can be exported or viewed online. Answers can also automatically populate portfolio values. Answer logics allow for different closed question answers to continue to a different question depending on the answer given. Equation questions can be used to manipulate the data gathered by questions.</td>
</tr>
<tr>
<td>My Profile</td>
<td>Personal profile including a photo, contact information, team data and what groups the individual is included in</td>
</tr>
<tr>
<td>My Dashboard</td>
<td>A tool for seeing a snapshot of activity on the site and highlighting certain criteria chosen by the admin users. Sample dashboard items include amount of storage space used, amount of user space used, total logins, who logged in today, who hasn’t logged in in last 7 days, who viewed the last uploaded file and more. This data can be categorised to allow admin to see specific information from a questionlist, for example.</td>
</tr>
</tbody>
</table>
3.3 Procedure

3.3.1 Online observations (Field Notes)

Naturalistic observation was carried out through TPE over a three month basis in order to monitor activity. Uploaded content was observed and recorded on a regular basis, as well as interactions that were occurring between both coaches and athletes throughout several different teams. From this position, player engagement could be assessed. This allowed social structures and interconnected behaviours to be observed unobtrusively from a holistic perspective (Smith, 2010). The process of collecting the observational data is illustrated in figure 4 and an example of how the observations were recorded can be seen in figure 5.

<table>
<thead>
<tr>
<th>Date</th>
<th>Team</th>
<th>Who uploaded</th>
<th>Theme</th>
<th>What materials are being uploaded</th>
<th>What interactions/discussions are happening</th>
<th>What tools are being used and what do they represent?</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/11/2013</td>
<td>RFC</td>
<td>Danny Milton</td>
<td>Attacking play from single lineout</td>
<td>Continuous video clip of three phases of play</td>
<td>Discussion around attacking tactics, conversation between the coach and these players, Player and coach replied with further points on the 15th.</td>
<td>Video upload and discussion. Observation of video clip and discussion to promote learning in similar future situations</td>
</tr>
<tr>
<td>14/11/2013</td>
<td>RFC</td>
<td>Danny Milton</td>
<td>An opposition scrum attack. How could the team have defending this situation better?</td>
<td>Video clip of opposition scrum attack followed by several phases of defence</td>
<td>Coach questions how the situation could have been dealt with differently and one of the players replies with suggestion</td>
<td>Video upload and discussion. Reply to coaches question in tact</td>
</tr>
<tr>
<td>14/11/2013</td>
<td>RFC</td>
<td>Danny Milton</td>
<td>Attacking play from multiple scrums</td>
<td>Edited clips of scrums in possession and following phases in attack</td>
<td>Discussion by backs related to attacking positioning and movement. Coach replies and asks further questions on the 15th.</td>
<td>Video upload and surrounding discussion</td>
</tr>
<tr>
<td>03/11/2013</td>
<td>RFC 2nds</td>
<td>Danny Milton</td>
<td>Attacking from multiple lineouts</td>
<td>Lineouts in possession, followed by phases</td>
<td>Discussion between two players and a coach discussion the success of lineouts in the game, detailed conversation of specific lineout clips and critical evaluation of performance</td>
<td>Video upload and surrounding discussion</td>
</tr>
<tr>
<td>03/11/2013</td>
<td>RFC 2nds</td>
<td>Danny Milton</td>
<td>Highlights of match</td>
<td>Edited video clip of all important match events</td>
<td>No discussion</td>
<td>Video upload</td>
</tr>
</tbody>
</table>

**Figure 4.** An example of an observational data collection spreadsheet
Figure 5. A flow chart illustrating the process of observational data collection
3.3.2 Questionnaire design

The informational needs of the study were clearly identified prior to the questionnaire and interview questions being designed. This was to ensure the questions asked were valid and guided by the research objectives (Gratton and Jones, 2004).

Participants email addresses were stored within TPE and they were initially contacted via email which outlined the two possible response options, along with a blank copy of the relevant questionnaire attached. Firstly, they could complete the questionnaire on Word and reply with the document attached to the email. Secondly, they could log into TPE to answer it online. Instructions for this option were included in the email. The questionnaire was available on TPE for a number of reasons. Firstly, the questionlist function within the platform allowed for a questionnaire to be easily designed and distributed. Secondly, it was the same platform that was being used for the team’s PA provision so it was easily accessible for the participants, making the answering process more attractive and therefore more likely to gather a large amount of responses. This is reinforced by research that shows online questionnaires return fewer missing values than paper questionnaires (Lonsdale, Hodge and Rose, 2006). Being available 24/7, it provided enough time for participants to respond at a convenient time, increased time efficiency and had a low cost when compared to postal surveys (Gratton and Jones, 2004). TPE also allowed results of the questionnaires to easily be exported into an Excel spreadsheet, subtracting the need for time consuming transference of data.

The questionnaire contained a number of open and scaled questions. The open questions assessed both general experiences with performance analysis, as well as how much value is to be found in the use of TPE and its different functions. The reason for these questions was to encourage non-biased answers related to the participant’s honest thoughts on performance analysis. Likert Scaled questions were aimed at gaining a quantitative understanding of how much the participants agreed with certain statements (Gratton and Jones, 2004) in order to guide their thought process in a logical path through the use of the online platform and its functions. The
questionnaire questions can be found in the appendix (A-C). The initial audit of the platform’s functions allowed a comprehensive description of what each function represented to be created before designing the questionnaire. The questionnaire was split into four using TPE’s questionlist logic function. This allowed variations of the same questionnaire to be tailored specifically for players, coaches, analysts and sports science support staff, exemplified in figure 6. The questionnaire was made available to answer for a period of two weeks. An example of the report function which shows how completed questionnaires were stored is shown in figure 7.

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**Figure 6.** The coach-specific questionlist function as created on TPE
Figure 7. An example of TPE’s questionlist report function
3.3.3 Interview design

O’Donoghue (2010) states that interviews involve a preparation phase, a data collection phase and a data analysis phase. Semi-structured interviews were used because of their ability to allow in-depth experiences and perceptions to be gathered by the researcher (Cousin, 2009). In terms of preparation, individual interview guides were created for each interviewee. Examples can be found in the appendices (appendix D). Interviewees had responded to the questionnaire previously and their answers were read, allowing the interview questions to probe answers of interest further. Additionally, they were asked to read “Connectivism” (Cobner, 2013) prior to the interview to gain a better understanding of current issues and discussion points surrounding online platforms. During the data collection phases, six participants (2 coaches, 2 players and 2 analysts) were interviewed and are listed on table 4.
Table 4. A table detailing the interviewees, their role, their team and basic background information

<table>
<thead>
<tr>
<th>Name?</th>
<th>Role</th>
<th>Team</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coach A</td>
<td>Assistant Coach</td>
<td>Men's Rugby</td>
<td>Coach A is currently a senior coach for Cardiff Met RFC. His previous experience includes coaching Cardiff Blues age groups and is also a Level 4 WRU Coach and Coach Educator.</td>
</tr>
<tr>
<td>Coach B</td>
<td>Head Coach</td>
<td>Women’s Hockey</td>
<td>A Cardiff Met graduate, Coach B is both the Director of Hockey and Head Coach for the Cardiff Met Ladies 1st team. He is also a Wales international player.</td>
</tr>
<tr>
<td>Player A</td>
<td>Player</td>
<td>Men's Rugby</td>
<td>Player A has played for Cardiff Met rugby 1st XI for three years and has represented England students.</td>
</tr>
<tr>
<td>Player B</td>
<td>Player</td>
<td>Women’s Hockey</td>
<td>Player B is a Cardiff Met hockey 1st XI player who has also represented Wales at senior level.</td>
</tr>
<tr>
<td>Analyst A</td>
<td>Analyst</td>
<td>Men's Rugby</td>
<td>Analyst A is the current analyst for Cardiff Met rugby. He has worked as an intern for Munster rugby as well as gaining some experience at GA hurling.</td>
</tr>
<tr>
<td>Analyst B</td>
<td>Analyst</td>
<td>Men's Football</td>
<td>Analyst B is one of two analysts for Cardiff Met men’s football XI. Other experience includes working for Hockey Wales.</td>
</tr>
</tbody>
</table>

Interviewees were asked to read the participant information sheet (see appendices E) before signing the participant consent form (see appendices F).
3.4 Reliability/Trustworthiness

As the majority of this research was qualitative in nature, it is important to address the subjectivity within the interpretation of the data collected. There are a number of ways to assess the trustworthiness of such research. Although observer bias has the potential to be a source of untrustworthy data (O'Donoghue, 2010), the researcher was impartial because of a lack of involvement in the Cardiff Met Sport teams and had no preconceptions regarding TPE and its usefulness. In order to ensure reliable qualitative interview data was collected, copies of the transcripts were offered and if required, sent to the interviewee for their optional reading. No concerns were raised by those participants who were sent a copy of their interview transcription.

In terms of piloting the data collection process, the questionnaire was tested from all the participants' perspectives in order to ensure the question logic was correct and the process would not be problematic for participants during the crucial data collection period. Interview piloting was not carried out due to the semi-structured nature of the interviews not allowing for the exact planning of the questions.

There is also a clear requirement for other trustworthiness checks whilst undertaking qualitative research, such as reflexivity, but again, time constraints didn't allow for more advanced checks to be undertaken. This methodology has provided a suitable audit trail by providing a complete description of the participants, the data collection and data analysis processes. This ensures that others can follow, understand and judge a clear chronological path that the research has taken in order to carry out reliability checks (Gratton and Jones, 2004).
3.5 Data analysis

Gratton and Jones (2004) outline the three stages of qualitative data analysis as data reduction, data display and conclusion drawing. Once qualitative data had been collected, data reduction was carried out through coding. The tags assigned met Gratton and Jones’ (2004) key coding principles of being valid, mutually exclusive and exhaustive. The raw qualitative data collected from the questionnaires and interviews was therefore coded in order to create a logical structure that would provide the framework for discussion.

The aim of content analysis is to collect a comprehensive and broad description of the phenomenon and the intended outcome is to design concepts or categories (Elo and Kyngas, 2008). A mixed method of inductive and deductive was applied to allow for both pre-determined themes to be explored, as well as allowing the possibility for new themes to present themselves during the data analysis process. In terms of the quantitative data collected from the Likert scaled questions, a mixed inductive and deductive method was again applied in order to recognise where both differences and similarities lay.

The data was read several times through and coded into categories. This is because it is important that the researcher has a good understanding of the key themes, as insights are unlikely to present themselves if the researcher is not completely familiar with the data (Elo and Kyngas, 2008).
CHAPTER IV

DISCUSSION OF RESULTS
4.0 Questionnaire Responses

A total of 281 participants were invited to answer the online questionnaire, either through TPE or via email. There were a total of 65 responses. Table 5 shows a breakdown of the amount of players, coaches and analysts who responded within each team.

Table 5. A breakdown of questionnaire responses

<table>
<thead>
<tr>
<th></th>
<th>Players</th>
<th>Coaches/Sport Science Staff</th>
<th>Analysts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total users</td>
<td>Responses</td>
<td>%</td>
<td>Total users</td>
</tr>
<tr>
<td>Men's Rugby</td>
<td>70</td>
<td>14</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Women's Hockey</td>
<td>22</td>
<td>9</td>
<td>41</td>
<td>3</td>
</tr>
<tr>
<td>Men's Football</td>
<td>45</td>
<td>7</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Women's Rugby</td>
<td>48</td>
<td>8</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Women's Football</td>
<td>23</td>
<td>3</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Women's Basketball</td>
<td>20</td>
<td>3</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Men's Hockey</td>
<td>18</td>
<td>2</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>246</strong></td>
<td><strong>46</strong></td>
<td><strong>19</strong></td>
<td><strong>27</strong></td>
</tr>
</tbody>
</table>
4.1 Usage Levels

In order to gain data relating to how often the participants use TPE, a scaled question was included in the questionnaire. Figure 8 shows the mean responses, including the scale provided.

![Figure 8. How often do you login/monitor the TPE environment?](image)

The results from this question show how the online platform is used regularly by all teams, varying from daily, to either only in preparation for matches or post-match. Potential variables for this include the amount of content that is uploaded onto each team’s site, the time frame that each team has been active for and how active the coaches and analysts are when promoting its use.
4.2 General attitudes towards performance analysis

Before assessing the usefulness of the performance analysis provision at Cardiff Met Sport, including TPE, it was important to gain an understanding of how valuable the participants believed PA to be within their sport. Figure 9 shows agreement levels with a Likert scaled question asking the participant how strongly they agree with a statement highlighting the ability of the discipline to improve performance. This question was not present for the analysts due to their role within the provision being PA-specific; it was instead asked as an open question in order to gain richer data for later discussion.

![Performance analysis processes and outputs are important for analysing team and individual performance.](chart)

**Figure 9.** Performance analysis processes and outputs are important for analysing team and individual performance.

Figure 9 shows strong agreement, indicating Cardiff Met Sport students value PA within their personal and team development and believe that this form of feedback is beneficial for them. Moreover, coaches perceive PA processes to be even more valuable than the players. Previous literature supports this finding that performance
analysis feedback has many advantages for both coaches and players (Butterworth, Turner and Johnstone, 2012; Wright, Atkins and Jones, 2012). Due to Cardiff Met Sport being a relatively advanced organisation in terms of collegiate sport, it is unsurprising that players, coaches and analysts welcome the use of performance analysis processes because of the quality and accessibility of equipment and software available to them. Furthermore, the discipline may be of academic interest to a large majority of the players through studying content within their degree pathways.

4.3 Team Performance Exchange as a mechanism of feedback

Although the use of performance analysis at Cardiff Met Sport is undoubtedly valued, the extent to which it influences and impacts upon practice is debatable and requires discussion. Regardless of the academic difficulties in definitively positioning PA within the coaching process (Carling et al., 2013), it is important to note that both PA and its delivery is just one aspect of the coaching process. This is highlighted by the following participant’s comments about the use of TPE at Cardiff Met Sport:

“TPE is not there to coach, TPE is there as a string to your coaching process. It’s the vehicle which we can utilise to effectively disseminate information to people” – Coach A (Interview response)

From a coach’s perspective, this quote provides an example of how the delivery of analysis shouldn’t replace any aspect of what a coach does, rather supplementing it. PA should instead act as an available resource, assisting the provision of information and aiding the coaching process when required (Nelson and Groom, 2012).

At Cardiff Met Sport, regular training and competition means feedback received by the players has the potential to be intrinsic, extrinsically face-to-face and extrinsically analytical through TPE and the online content it houses. The benefits of extrinsic
feedback have been well documented as it is necessary to accelerate the learning process (Maslovat and Franks, 2007), especially at Cardiff Met Sport where performance improvements are difficult to achieve because of the advanced level at which a large amount of athletes are performing at. Owing to TPE operating online, a lack of coach interaction during this feedback process is likely to be problematic for some. This highlighted the importance of gathering player’s opinions on what form of feedback was most useful to them:

“I like both, I like getting feedback immediately after my performance, but then you can get more detailed feedback after looking at the video”. – Player A (Interview response)

“It allows me to visually see what aspects I am doing well and what I need to improve on. This visual aid provides a different level of feedback to that provided from the coaches which I find vitally important”. – Player questionnaire response

These quotes show the benefits of receiving feedback from a coach during practice, as well as on TPE at a later time. It is unsurprising that Player A values TPE’s ability to provide video as they have represented England Students at rugby and skilled performers benefit most from video feedback of their performance (Lawrence, Kingston and Gottwald, 2013). It is interesting to compare this with the player questionnaire response, who states how they find the video feedback just as crucial to their development, even though they are not participating at an elite level. This points out the range in benefits that can be found for both highly skilled athletes and recreational performers.

Feedback provided online has a clear advantage over other forms of feedback in its ability to target a large number of users in less time whilst expending less effort, reducing the need for extensive discussions with individual players and ensuring face to face training time can be used more efficiently (O’Donoghue and Mayes, 2013):
“With 50 players a year playing 1st XV rugby at Cardiff Met and 150 players in total trying to give feedback and meet with players is not practical”. – Coach A (Interview response)

“Nothing is better than seeing players one to one and being there in person but within our environment where coaches and players are lecturers and students in the first instance, this allows us to give a level of feedback we wouldn't be able to provide”. - Coach A

The general themes emerging from the coach’s perspectives agree that although verbal feedback provided to a player is invaluable and cannot be replicated, TPE is a suitable alternative to overcoming time and practicality restraints. As Coach A states, Cardiff Met’s players and coaches are students and lecturers respectively, so time management is crucial for finding a successful balance between academic and sporting commitments. Results show that TPE has the ability to facilitate this feedback when time is limited.

The main advantage that video footage has over coach-driven feedback is the ability to go back and compare optimum performance with actual outcome (Liebermann, 2002). When prompted to provide instances when TPE could be preferred to instant coach-led feedback, many questionnaire responses pointed to its ability to clarify events and evaluate their perceptions of what happened against the actual outcomes, supporting research by Mackenzie and Cushion (2013). One example provided by a coach stated how a disagreement between the players and the coaches was overcome by revisiting the footage on TPE and clarifying the actual events so the issues could be rectified in training. This has a link to the work of Franks and Miller (1986) and, more recently, Laird and Waters (2008), whose studies underlined the problematic nature of recalling incidents from a performance with success. It can also be said that as well as clarifying incidents within a game,
TPE encourages players to take ownership over their game involvements during the deconstruction of performances:

“There are no hiding places with the TPE provision. It allows players to take ownership of the performance review process”. – Sport science support staff questionnaire response

“(I) feel that the feedback on TPE creates more honesty when giving yourself feedback and also trust in others giving you feedback as the clips can be used as evidence of good/poor performances”. – Player questionnaire response

There is also the sense that TPE lends itself to certain sports to a more advanced level than others. Sports at a level of development where performance analysis feedback is commonplace allow for a smoother insertion of PA feedback because of what is expected. Observations showed a proactive willingness and acceptance towards PA within rugby, whereas both men’s and women’s hockey and football players were less prepared to engage in PA processes. This is further illustrated by a rugby coach’s comment:

“I think there’s probably a culture within the sport where there’s more of an expectation for those sorts of things to happen” – Coach A (Interview response)

This proves that the nature of the sport may also have an impact, highlighting the requirement for further case study style research within this area (Lyons, 2005; Carling et al., 2013). Certain sports at Cardiff Met Sport lend themselves to different types of PA feedback. For example, a large amount of notational information is gathered from the women’s basketball matches and presented in a tabulated
breakdown of statistics, whereas football, rugby and hockey tailor their feedback more towards tactics and game highlights:

“Given the sheer volume of information that comes from a basketball game, visualising data becomes very important when feeding back to the girls”. – Analyst questionnaire response

4.4 Communication and discussion for learning

Similarly to previous literature discussing the role of the athlete within the analysis process (Bampouras, Cronin and Miller, 2012), it was important to assess the role of the athlete in Cardiff Met Sport’s PA provision. Through the researcher’s observations, it was clear to see differing levels of interaction in different teams.

The TPE environment has facilitated interaction and communication between coaches, players and other support staff.

1 - strongly disagree
4 - disagree
7 - agree
10 - strongly agree

![Chart showing interaction and communication levels between coaches, players, and support staff.](chart_image)

**Figure 10.** The TPE environment has facilitated interaction and communication between coaches, players, and other support staff.
Note. The women's basketball coach had no experience with using TPE and hadn’t been provided with training using the platform prior to the questionnaire.

Figure 10 evidences this observation, showing a high amount of variation between the teams and roles. A deciding factor in these significant differences lies with the individual coach’s intentions for the team’s use of TPE. Some coaches will be looking for the benefits of a community of practice as the players, coaches and analysts have a shared environment and resources (Culver and Trudel, 2008; Cobner, 2013), such as within the men’s rugby and women’s hockey squads. On the other hand, some coaches may instead see TPE as a repository of content alongside organisational functions, in which little communication occurs, such as with the women’s basketball and women’s rugby squads. It was important to study to what extent athletes are communicating through the platform, assessing whether it is traditional coach-led question and answer interaction, or whether a more multi-directional dynamic style has been adopted.

“The athletes are empowered to drive it themselves and it allows them to digest at their own pace and time”. – Coach questionnaire response

“We, as staff, can pose questions that they can elaborate on or pose questions back, but not only to us as staff but to each other, so actually it’s an environment for shared learning where they learn from each other, with each other, in order to overcome the problems they see within the environment” – Coach B

The general consensus from questionnaire and interview responses stated how the coaches who target high levels of interaction tend to pose a question with the intention of creating an environment in which there is coach-athlete, athlete-coach and athlete-athlete discussion. Observations show that the men’s rugby team, in their third season of utilising TPE, have a relatively reciprocal arrangement where a coach may ask a question but responsibility over the discussion will move to the
players. This can be contrasted with the women’s hockey team, who are in their first season with TPE, in which the coach is attempting to initiate some player-led discussion:

“I think especially at the moment where athletes aren’t engaging as much as they could, it can become slightly one dimensional, the provision is through from staff to the players. In terms of using it for discussion and as an exchange environment, it’s relatively limited at the moment”. – Coach B

This quote, from a women’s hockey coach, brings to light the difficulties in gaining engagement from players since TPE’s introduction, especially encouraging them to participate in a meaningful two way dialogue. It is also important to note that although discussion may not be occurring through TPE, such as within the women’s basketball team, this doesn’t necessarily mean that it isn’t occurring. Especially within the teams in their first season of using TPE, users who aren’t yet comfortable with voicing their opinions online can look to discuss issues elsewhere:

“I think at the moment, because it is so new to use, we don’t really know how to approach it so I think the more we’ve gone on, the more people start asking questions outside of it”. – Player B

The potential for TPE to create an environment for learning away from the platform acts as a trigger to initiate further discussion in future. Some individuals may prefer to communicate around the platform this way, as player’s differing learning styles could have an impact on their willingness to involve themselves. There is a requirement from the coach to understand all their players different learning styles in successfully guide the learning process (Hammond et al., 2001).
Figure 11. It is important that consideration is given to athlete and player learning styles when providing feedback.
Figure 11 illustrates how important Cardiff Met Sport coaches and analysts perceive emphasis on player’s learning styles to be. In comparison, results from players in figure 12 shows less of an agreement that the content available on TPE is suitable for their personal learning preference. Although it can be argued that all TPE content is visual in nature and beneficial for those individuals who are visual learners, there is potential for other learning styles to be targeted using slightly different techniques. This is exemplified by the women’s hockey coaches using voice overs alongside video feedback provided to individual players in order to create another avenue of feedback for those who may learn better through an audio description by the coach. Not only does this cater for the individual athlete’s learning style, there are also benefits from the coach’s perspective as it allows emphasis on certain points using the coach’s tone of voice. The targeted player can also follow the coach’s train of thought in a logical manner.

As well as content provided to the players, there is the option for players to alter their use of TPE to suit their own learning style. Throughout all teams’ use of TPE, players can use the platform as they wish; it is a tool for their development and they are encouraged to take an element of ownership over their learning. They can choose to comment or not comment, watch or not watch, their engagement is optional.

“Some players will want to write down their thoughts and interact in that way, some people watch it, then talk to me about it, but don’t write anything down, so that’s an interesting side of TPE that you don’t see” – Coach A

This links to a recurring theme arising from both questionnaires and interviews with coaches; how to gain maximal engagement through TPE from the players.
4.5 Reasons for engagement

Through observations, it was clear to the researcher how initial engagement was difficult to initiate within teams in their first season of utilising TPE. This said, players were much more willing to become involved in the platform and its processes once it was possible to visualise the potential benefits. One of the main reasons for engagement is the link between the content and interactions on TPE and training sessions. Especially in teams with higher usage levels, such as women’s hockey and men’s rugby, a lack of knowledge about the recent videos and surrounding communication on the platform will have an impact on training preparation. Not only will a lack of engagement hinder the learning process for that player, it also has an impact on engagement with the rest of the team:

“Consistently within training sessions, I’ll go who’s seen the latest clip I’ve put up on TPE and someone will go yeah I have and some haven’t and straight away the ones who haven’t feel alienated. I’ll be like if you haven’t seen it, you’ve missed out, it’s your fault”. – Coach B

“We’ve had to look at the video before training otherwise we wouldn’t actually know what we are focussing on and what went wrong” – Player B

In turn, this links to the newly formed principle of flipped learning. By viewing content away from the team environment prior to a training situation, individuals are prepared to develop to a more advanced level due to their knowledge of what upcoming practices are likely to entail. Consequently, this speeds up the learning process and acts as an aid for in-depth collaboration (Hoffman, 2013). It requires the learner to take ownership over their learning. There is a plethora of research supporting the
concept that learning targets will only be met if the learner has ownership over them (Nichol and Macfarlane-Dick, 2006).

![Athletes/players should undertake aspects of the analysis process e.g. own team, unit, opposition analysis etc.](image)

**Figure 13.** Athletes/players should undertake aspects of the analysis process e.g. own team, unit, opposition analysis etc.

Figure 13’s results are a contradiction to the source of most content on TPE; most analysis is carried out by the team’s analyst. Although there are relatively high agreement levels from coaches in the men’s rugby, men’s football and men’s hockey teams, there is little or no analysis carried out by players which is then uploaded on to TPE. Coach agreement is especially high, dismissing the notion that the coach or teacher may have a fear of giving up control (Thiele, 2013). If a player is knowledgeable about the best method in which they can develop, a coach is much more likely to allow them to take control over their learning. Even though there is little self-analysis carried out by players at Cardiff Met Sport, this doesn’t necessarily mean that ownership over learning doesn’t occur. The closest example of a similar situation can be found within the men’s football team:
“Our team’s GK requests footage of every time he touches the ball or is involved in play. This is to analyse his own performance in terms of positioning, technique etc. to continuously improve”. – Analyst questionnaire response.

This example shows how taking ownership over learning and development can act as a catalyst for engagement within TPE. Although there was no requirement for this to happen from a coach, the player took ownership and utilised the available resources to give themselves the potential to develop. If players are refusing to take ownership over their learning, it is possible for coaches to monitor to what extent individuals are engaging. At this point, it must be explained that it is possible for coaches and analysts to see if/when a user has viewed a certain file. For this reason, it makes it easy to track engagement levels and monitor which members of a squad are interacting with certain content:

“Being able to track who has viewed what I have put up on TPE, it lets me know who is actually viewing the analysis and how many times they have viewed it”. – Analyst questionnaire response

This was a common response from analysts. This can be attributed to their assessment of their own analysis that is provided; it allows them to see whether players are engaging in what they are uploading. In turn, this gives the analyst an insight into whether they need to make alterations to their content to make it more attractive for the players. Equally, these statistics give coaches the potential to encourage players who aren’t involving themselves as much. From this position, onus is very much on the coach to act on engagement statistics as analysts have little power over the players at Cardiff Met Sport. This reinforces and emphasises the need for further research which will gain a more detailed understanding on the coach-player-analyst relationship and how to make sense out of such a dynamical and delicate association.
The final and perhaps most intrinsic reason for a player’s engagement is related to how TPE allows tracking of performance over an extended period of time. This allows for comparisons to be made against the player’s own previous performances, as well as against team mates. This can mean statistics, such as strength and conditioning figures, which are available for all players in the women’s hockey team to see:

“With the strength and conditioning you can compare to other people rather than just a sheet of paper, so you can look at your progression throughout”. – Player B

Improvements in performance are often slow and steady, especially within strength and conditioning, and being able to monitor progression over time and visualise that improvements are occurring is likely to be a strong motivator for engagement. This is especially valid as engagement levels over the season tend to rise and fall:

“We have boys in pre-season, September and October, they’re on it all the time, November December when their assignments start coming in, building up to Christmas, we see their ability to use it goes down, similarly now, February march, trying to get them on there at the moment with their dissertation hand in, with other assignments, we see a big drop off in when they use it and then again they’ll start to pick up again when we move towards the BUCS final, and selection becomes important, all of a sudden people will be on there more”. – Coach A

Engagement from the start of the season is crucial due to the improvements that are necessary in performance before the important matches towards the end of the season. Observations have agreed with Coach A’s comments, as interactions involving players lessened over Christmas and during January before increasing again as the BUCS finals nears. Although discussion has explained how engagement needs to be organic and not dominated by coach involvement, this highlights the requirement for some form of framework establishing rules of
engagement supported by the expectations of stakeholders (Cobner, 2013). Such a policy would ensure players are utilising the resources available during the times the coaches require.

### 4.6 TPE facilitating a multidisciplinary environment

“In terms of the multidisciplinary environment, I don’t think that I would require anything else at the present time” - Coach B

“In an ideal world, I’d have the referee on there, I’d have an in-depth strength and conditioning approach on there, I’d have a sports psychologist on there, I’d have a nutritionist but for that I need to have players that want it and ask for it and also other people who are prepared to engage in it”. – Coach A

At this point, it is important to reinforce that TPE is an online athlete management tool which has the ability to share content, promote communication and create secure sub-teams (Analysis Pro, 2013). It is a platform that has the potential to store and present a range of data, amongst other functions such as My Calendar and My Messages, which can be used by a range of disciplines; although Cardiff Met’s use is mainly related to performance analysis, it is not solely a performance analysis tool. Keeping this in mind, Coach A and Coach B show differing opinions on the usefulness of other content. This could be attributed to the amount of time the teams have been using the platform. The women’s hockey, in their first season, could be at a point where the PA is their main concentration during its introduction stage to the players and the coach is careful to avoid overloading with too much science-based feedback. This agrees with Franks, Hodges and Moore's (2001) principle that in order to be effective, feedback must be relatively simple and directly related to the team's goals. It must be made clear that the women’s hockey squad do have access to a small amount of both psychological support and strength and conditioning results. In comparison, Coach A sees the platform as an encompassing
environment with the possibility for it to act as a hub for a wealth of content that is available for players should they wish to engage in it.

One benefit of having such content available is to improve all aspects of a player’s skill-set, similarly to the provision that would be available for professional athletes in an elite environment. This results in psychological benefits for the players, as they feel more motivated to be a part of the environment if they can see how it replicates what a professional club might be providing:

“I think there’s a sense of professionalism as they can look at it and see the Netherlands hockey are using it, all these different teams are using it, so they feel part of that”. – Coach B

“When you’re in it, you want to stay in it, so for me psychologically it definitely has a benefit and the more professional something is in an elite sports university, we should be trying to deliver elite sports performance” – Coach B

Coach B translates the psychological benefits of being part of an elite sports organisation to producing elite sports performance, highlighting the importance of the link between preparing professionally and performing professionally with TPE as one tool to assist in achieving that goal.
4.7 Functional strengths and areas for improvement

![Organisation and planning has been positively impacted by the use of TPE.](image)

**Figure 14.** Organisation and planning has been positively impacted by the use of TPE.

Figure 14 shows strong correlation between agreement with the statement and the level to which that team has engaged with the platform. It must again be stated the women’s basketball coach had no training or experience using the platform. Organisation and planning is likely to occur through the My Messages and My Calendar functions and observations show that My Calendar is a commonly used function that is relied upon and valued by coaches, players and analysts. One interesting discussion point is the ability of the calendar function to encourage the use of other functions; if a player is using the platform to look at training or match times, it is likely they will also explore other aspects of the platform whilst they are online.
It is important to state the differences in functions that are available for each role. Coaches have access to certain functions that players do not, such as My Templates, My Team and My Groups. Furthermore, analysts will have explored the video uploading process more than coaches so will have a better understanding. Results from figure 15 show that players, especially in the women’s football team, have difficulties navigating around the TPE platform. It must be stated that there are tutorial videos available if coaches or analysts haven’t provided suitable training. Extensive use of the platform is likely to expel any issues regarding navigation, through experience and trial and error.

**Figure 15.** The TPE interface and features that are available are easy to navigate and use.
<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting data</td>
<td>Source</td>
</tr>
<tr>
<td>“The use of My Portfolio has been good, and I’ve kind of uploaded a lifestyle support programme on there, for them to fill out”.</td>
<td>Coach B</td>
</tr>
<tr>
<td>“We utilise the calendar for all our training and matches so players are aware of when and where they are meant to be. It has been very beneficial in organisation and planning”.</td>
<td>Coach questionnaire</td>
</tr>
<tr>
<td>Quote</td>
<td>Questionnaire Type</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td>“Over the Christmas break checking the calendar to know what the upcoming schedule is”.</td>
<td>Player questionnaire</td>
</tr>
<tr>
<td>“Having the calendar has been useful to remind myself when and where the games are being played throughout the season”.</td>
<td>Analyst questionnaire</td>
</tr>
<tr>
<td>“Easy uploader, user friendly”</td>
<td>Analyst questionnaire</td>
</tr>
<tr>
<td></td>
<td>My Files</td>
</tr>
<tr>
<td></td>
<td>Sport Science Support staff questionnaire</td>
</tr>
<tr>
<td></td>
<td>Coach questionnaire</td>
</tr>
<tr>
<td>“They’re good and I am going to engage in those over the summer for joining students in the New Year and returning students”.</td>
<td>Coach B</td>
</tr>
<tr>
<td></td>
<td>Coach A</td>
</tr>
<tr>
<td>Commonly stated as a useful feature on coach questionnaire responses</td>
<td>Coach questionnaire</td>
</tr>
<tr>
<td>“I can definitely see it (being used) in dead ball situations, set pieces”.</td>
<td></td>
</tr>
<tr>
<td>“We could use them for set plays because a lot of people have different ideas for sets plays coming from different. It would be a lot better because everyone could see it visually”.</td>
<td>Analyst B</td>
</tr>
<tr>
<td></td>
<td>Player B</td>
</tr>
</tbody>
</table>
“Once I knew where everything was, it was pretty easy, it’s quite user friendly, you have your dashboards which really links everything in so it was quite straightforward”.

<table>
<thead>
<tr>
<th>Analyst questionnaire</th>
<th>Other</th>
<th>Coach questionnaire</th>
<th>Analyst questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>“Phone access and iPad access requires improvement, especially when dealing with day to day diaries etc.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Workflow needs to be condensed and much more consistent. More space on basic account as making video files small enough can be time consuming process. Word, Excel and PowerPoint files to be visually seen and edited on TPE. Simpler interface and control systems - too clunky at present. TPE easily overloads and crashes. More practical examples for coaches to see how each of the icons can be used in practice”.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“The size of the storage available means that footage has to be removed regularly”. This was a common theme.</td>
<td></td>
</tr>
<tr>
<td>Analyst questionnaire</td>
<td>“The layout on the right hand side. When I first started using TPE I wasn’t clear on where I had to go to do things on TPE”</td>
<td></td>
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</tr>
</tbody>
</table>

**Table 6.** An assessment of TPE’s functions with supporting data
As indicated in table 6, players, coaches and analysts agree that there are functional improvements that need to be made in order to make the platform more useable and the workflow more efficient. Coaches agreed that My Portfolio could be utilised further if presentation of data was improved. It appears there is the potential for certain functions to be employed if practical examples were provided of what they can offer, alongside training; participants stated they would like to explore the use of My Analysis if its possibilities were exemplified. A large amount of improvements are related to technical issues that arise during use, especially when a mobile device is being used, indicating the potential need for a purpose application in order to overcome these issues. The functions that have been engaged with more, such as My Files and My Calendar have proved relatively useful for a majority of users, with the benefits comfortably outweighing the weaknesses.

![Figure 16. TPE has been beneficial in supporting performance.](image)

In relation to the aim of the study, it was imperative to gain an understanding of whether the coaches view TPE as a useful addition to their team’s development and as an advantageous service in supporting their team’s success. Figure 16’s results disagree with Liebermann and Franks (2004) who stated that many practitioners remain sceptical about the use of technology within performance analysis, indicating
a shift in the discipline, welcoming the use of suitable and applicable technology. The findings have confirmed the traditional view that feedback interventions can have a large and positive effect on performance (Kluger and DeNisi, 1996). Although it is clear that TPE has had a positive impact on those teams that have engaged with it, the extent to which it has directly impacted on player development and team success is difficult to measure:

“I can give you my perceptions and my observations and my reflections, but I can’t give you any evidence based research on the improvements. If I was to give you my observations, I know it works because I’ve seen clips go up, I’ve seen us watch those clips, talk and discuss, just having watched it I see us going to our next game and modify our practice because of it with success so that tells me straight away that that’s worked”. – Coach A

Assessing the ability of the platform to ultimately improve performance therefore somewhat lies with the coach’s subjective opinion of what they have experienced and the observations they have made since the platform’s introduction. Although it is impossible to quantitatively link improvements to TPE, it is possible for coaches to judge whether the speed and quality of alterations in a player or team’s performance and ability has been impacted.
CHAPTER V
CONCLUSION
5.0 Conclusion

The purpose of the study was to carry out a detailed assessment of the performance analysis provision at Cardiff Met Sport through the use of an online platform (TPE). The intention of the research was to meet a shortcoming in previous academic literature that failed to produce qualitative findings which could be used to further knowledge in an applicable sense. The research has found a wealth of valid findings in relation to how useful coaches, athletes and analysts at Cardiff Met Sport perceive performance analysis feedback to be when delivered through TPE.

It was found that although analytical processes are highly valued by all participants, this didn’t directly translate into participant’s use of the platform, illustrated by drastically varying usage figures. Interestingly, this was often attributed to the sport itself, highlighting the ability of certain sports to lend themselves to the platform more so than others. Equally, the amount of time that the platform had been used for within each team had an impact on coaches’ abilities to maximise athlete interaction. Furthermore, it was found that a majority of athletes rated TPE as a mechanism of feedback when compared to verbal face-to-face feedback, whilst recognising the negatives that can be found in a lack of coach interaction. There were many questionnaire responses highlighting athletes’ use of the platform to simply view content and clarify match events, rather than engage in the platform as a learning and development tool. This was in contradiction to a majority of the coaches’ intentions, as they see the content on TPE as a trigger to initiate a deeper level of learning through multi-directional communication. Saying this, not all coaches had yet made attempts to encourage this interaction because of a lack of experience using the platform. In turn, this communication had a direct correlation with athlete’s familiarity; the longer they had been using it, the more likely they were to engage with coaches and other athletes. The present study also highlighted which functions of the platform were used by the teams and what aspects they valued, as well as what functionalities they believe need to be improved.
Unexpected findings arose when discussing the current non-performance analysis content that is present on TPE, as well as the potential for other disciplinary material to be uploaded. There was a mixed response from coaches, athletes and analysts, who differed in opinion when questioned about how useful and applicable the strength and conditioning, psychological and nutritional information was.

5.1 Recommendations for future research

Although the athlete’s perceptions of performance analysis are beginning to be studied (Francis and Jones, 2014), the bank of such literature is still relatively limited and needs broadening across different sports and within different provisions. This research has acted as a gateway for other case-study style research to be carried out in ‘real-world’ settings, further bridging the gap between quantitative and qualitative research within performance analysis. It has successfully attempted to meet the call for producing applied findings evidencing the systematic application of performance analysis in relation to coaching practices (Mackenzie and Cushion, 2013). Therefore, the current study has begun to indicate potential directions for further research:

- The necessity for the current study to be repeated at a later time when certain teams are more experienced in using the platform over a longer time period, allowing for a comparison to be drawn.
- A similar study to be carried out assessing the usefulness of a different online platform.
- An assessment of a PA provision within a professional sporting environment.
- Further qualitative research attempting to gain a more detailed understanding of athlete’s honest perceptions of PA and the most effective manner of its application.

As aforementioned, limitations of the study can be found in its inability to transfer findings to other organisations due to its specificity with Cardiff Met Sport, its non-
professional context and constantly altering social structures between coaches, athletes and analysts.

References


Behaviour, 9(1), 38-45.


Appendices
Appendix A
Coach/Sport Science Support Staff questionnaire guide

1) Using the 1-10 scale provided, please select how strongly you agree with the following statement: Performance analysis processes and outputs are important for analysing team and individual performance.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

2) Using the 1-10 scale provided, please select how strongly you agree with the following statement: It is important that consideration is given to athlete and player learning styles when providing feedback.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

3) Using the 1-10 scale provided, please select how strongly you agree with the following statement: Athletes/players should undertake aspects of the analysis process e.g. own team, unit, opposition analysis etc.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

4) If possible, please provide an example of when athletes/players have undertaken aspects of the analysis process e.g. own team, unit, opposition analysis etc.
5) Using the 1-10 scale provided, please select how strongly you agree with the following statement: The TPE environment has facilitated interaction and communication between coaches, players and other support staff.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

☐
6) If possible, please provide an example of interaction and communication taking place through TPE.

7) Using the 1-10 scale provided, please select how strongly you agree with the following statement: TPE has been beneficial in supporting performance.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

8) Using the 1-10 scale provided, please select how strongly you agree with the following statement: Organisation and planning has been positively impacted by the use of TPE.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

9) As a virtual sharing and communication tool, how does TPE compare with other
mechanisms of feedback you provide?
10) Using the 1-4 scale provided, how often do you monitor/upload content on TPE?

1- Regularly (Daily Basis)  2 – 2/3 times a week  3 – Once a week  4 – Only in preparation for matches/post match

11) What aspects/features of TPE have you found most useful?

12) What aspects/features of TPE have you found least useful?
13) What aspects/features would you modify/change?
Appendix B
Player questionnaire guide

1) Using the 1-10 scale provided, please select how strongly you agree with the following statement: Performance analysis processes and outputs are important for analysing team and individual performance.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

2) Using the 1-10 scale provided, please select how strongly you agree with the following statement: The content provided on TPE has been useful to my individual learning style, performance and player development.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

3) Using the 1-10 scale provided, please select how strongly you agree with the following statement: Athletes/players should undertake aspects of the analysis process e.g. own team, unit, opposition analysis etc.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

4) If possible, please provide an example of when you have undertaken aspects of the analysis process e.g. own team, unit, opposition analysis etc.


5) Using the 1-10 scale provided, please select how strongly you agree with the following statement: The TPE environment has facilitated interaction and communication between coaches, players and other support staff.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree
6) If possible, can you give an example of when you have engaged in communication and interaction through TPE?

7) Using the 1-10 scale provided, please select how strongly you agree with the following statement: Content shared through TPE is complementary to my learning style.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

8) As a virtual sharing and communication tool, how does TPE compare with other mechanisms of feedback you receive?

9) Using the 1-10 scale provided, please select how strongly you agree with the following statement: The TPE interface and features that are available are easy to navigate and use.
10)  
1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

11) Using the 1-4 scale provided, how often do you login and use the resources on TPE?

2- Regularly (Daily Basis) 2 – 2/3 times a week 3 – Once a week 4 – Only in preparation for matches/post match

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Appendix C
Analyst questionnaire guide

1) To what extent are performance analysis feedback processes important for analysing team and individual performance?

2) How do you identify key aspects of performance and analyse the performance of the team(s) you are involved with?

3) Using the 1-10 scale provided, please select how strongly you agree with the following statement: It is important that consideration is given to coach, athlete and player learning styles when providing feedback.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree
4) Using the 1-10 scale provided, please select how strongly you agree with the following statement: Athletes/players should undertake aspects of the analysis process e.g. own team, unit, opposition analysis etc.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

5) If possible, please provide an example of when athletes/players have undertaken aspects of the analysis process e.g. own team, unit, opposition analysis etc.

6) Using the 1-10 scale provided, please select how strongly you agree with the following statement: The TPE environment has facilitated interaction and communication between coaches, players and other support staff.

1 – Strongly disagree  4 – Disagree  7 – Agree  10 – Strongly agree

7) If possible, can you give an example of TPE facilitating interaction and communication?
8) How have you found TPE for presenting and sharing your analysis?

9) Using the 1-4 scale provided, how often do you monitor content and user activity on TPE?

1 - Regularly (Daily Basis) 2 – 2/3 times a week 3 – Once a week 4 – Only in preparation for matches/post match
10) What aspects/features of TPE have you found most useful?

11) What aspects/features of TPE have you found least useful?
12) What aspects/features would you modify/change
Appendix D
Interview Guide - Luke Hawker

Title of Project: Evaluation of a performance analysis provision and intervention using an online platform (Team Performance Exchange).

10/2/2014

Q1) Hi Luke, thanks for agreeing to participate in this interview today and thank you for completing the questionnaire previously. Could you give me a brief summary of your playing and coaching history?

Probes - and your role here at Cardiff Met?

Q2) This interview will be structured around your questionnaire answers regarding Team Performance Exchange’s functions and their usefulness. I will also make reference to Darrell Cobner’s blog “Connectivism”. How long have you and your squad been utilising TPE?

Q3) How has engagement been from players in the analysis and discussion process through TPE, and how has this developed since its introduction?

Probes – Through the observations I have been carrying out, one of the more detailed aspects of your use of TPE has been player’s individual folders. What value do you find in this?

You are the only team at Cardiff Met currently using voice overs over video. Can you explain how using this method of communication is important for you?

Q4) Have you seen a noticeable improvement in player development?

Q5) Darrell’s blog mentions the potential requirement for “rules of engagement” and “expectations of stakeholders” when using an online platform. Have you ever held a team discussion/meeting surrounding what is expected of the players surrounding TPE, is there a set of ground rules and are players aware of what is expected of them?
Probes - How often they should participate in discussion, should they view and observe by a certain time/date?

Q6) You mentioned these “chat room style” comments and engagement surrounding content are valuable but have limited engagement due to their recent introduction. How would you like this aspect to develop in the future?

Probes – You have utilised Brendan Cropley as a psychologist on TPE. Is there any scope for other disciplines input e.g. a nutritionist, biomechanist?

Q7) You mentioned weekly reviews being sent to players via TPE, can you go into more detail explaining what these include?

Probes - How do players respond to them?

Q8) One of your questionnaire answers mentioned quotes and images being used, “Promoting buy-in, athlete belonging and engagement”. This is also mentioned in Darrells blog. Do you feel the personalised, password-protected environment allow the players to feel part of a community of practice, more than just a sports team?

Probes - are there psychological benefits – a sense of belonging?

Q9) One of your questionnaire responses stated “I would originally suggest the lack of face-to-face interaction” as a limitation – although you went on to say you can still get across the information required. Do you think the feedback provided online can be just as valuable as face-to-face discussion?

Probes – Differing learning styles, do athletes have the option to discuss any content in person if they wish?
Q10) You also mentioned one of the limitations of TPE was “the management and presentation of multiple sets of data” Can you provide more detail on this?

Q11) You stated that you were unsure what “My Analysis “actually does. The rugby team have used it to illustrate line out moves using pitch diagrams and markers. It is also possible to plan training drills, as well as carrying out graphical analysis online of both training and matches manually. These plans and analyses can be linked to players or printed off and presented on paper. Can you see a use for this function within your hockey squad?

Q12) You mentioned that the mobile access through iPhone and iPad requires improvement. Can you explain how a purpose built mobile application for TPE would benefit you and the team?

Q13) Is there any communication/interaction between the players and analysts either through TPE or face-to-face?

Q14) Finally, do you have any experience with any other online platforms?

Thank you for your time today, it is invaluable in the development of my research. I will send across a copy once it has been transcribed.
Appendix E
Participant Information Sheet

Title of Project: Evaluation of a performance analysis provision and intervention using an online platform.

Information Sheet

Background
This study is assessing performance analysis provision in a range of team sports using an online coaching/communication platform. It will aim to discover the impact performance analysis has on players and coaches and to what extent the information they receive is beneficial. It will look at what types of PA feedback are helpful whilst studying levels of communication, method of delivery and differences between genders and sports.

Are there any risks?
The study only asks for interviews and questionnaires to be responded to, so no significant risks are present.

Your rights
You will not give up any legal rights.

What happens to the results of the study?
The information and results gained from both the interviews and questionnaires will only be used and published in the study with full consent from the participants.

Are there any benefits from taking part?
Yes, the findings will inform both players and coaches with information on what methods of performance analysis feedback and related issues are deemed to be most beneficial for themselves within their sport.

What happens next?
Coaches: A set of interviews questions will be asked, recorded and transcribed, before the answers are analysed.
Players: A set of interviews questions will be asked, recorded and transcribed, before the answers are analysed.

How we protect your privacy:
Everyone working on the study will respect your privacy.

**Further information**

If you have any questions about the research or how I intend to conduct the study, please contact me on 07714789023. Sam Mincher.
Cardiff Met Consent Form

Title of Project: Evaluation of a performance analysis provision and intervention using an online platform.

Name of Researcher: Sam Mincher

Participant to complete this section: Please initial each box.

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

2. I understand that the participation is voluntary and possible to stop taking part at any time, without giving a reason.

3. I also understand that if this happens, our relationships with Cardiff Met, or our legal rights, will not be affected.

4. I understand that information from the study may be used for reporting purposes.

5. I agree to participate in this study.

__________________________________
Name of participant

__________________________________
Signature of Participant

Date
Supervisor

Yours sincerely,

Cardiff School of Sport Research Ethics Committee meeting on 26th June 2013.

Your project was recommended for approval by myself as Supervisor and formally approved at the meeting.

Project Reference number: 13/03/251V

To: Samuel Milner

Date: 14/03/14