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A PLAYER EFFECTIVENESS ANALYSIS SYSTEM IN ELITE FOOTBALL USING AN ACTION DESIGN RESEARCH FRAMEWORK

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ABSTRACT

The aim of this study was to investigate the effective implementation of an Action Design Research (ADR) approach within an elite football performance environment in New Zealand. The research incorporated player- and coach- driven performance objectives within an ADR framework to develop the Player Effectiveness Analysis System (PEAS). The ADR framework followed the structure of problem formulation (position and match specific), objective solutions, design and development, demonstration, reflection and learning and formulation of learning. This framework was used alongside the Performance Analysis (PA) multidisciplinary approach from Glazier (2010), which focused on the technical, tactical, physical aspects of performance. The initial findings of the research were that the implementation of the ADR approach created an effective, shared playing analysis system, increasing relevancy in the communication levels and understanding of both coaches and players. Changes to the design PEAS artefact took place. As a result of these changes, the PEAS specificity increased and improved the value of taking the multidisciplinary approach. Future recommendations were put in place to be able to continue the ADR process.

Keywords: Action design research; Football performance; Performance analysis; Multidisciplinary approach

PROBLEM STATEMENT

The evolving nature of professional sport has led to the requirement for the integration of performance analysis (PA) in elite training, planning and design. The quantitative analysis of both player and team motor activities has become one of the most important aspects of modern training (Andrzejewski *et al*., 2014). Effective application of feedback is critical and aids the ultimate goal of enhancing future performance (Malone *et al*., 2015). However, there is a strong feeling of disconnect between PA feedback and its depth of application within high-performance sport environments (Farrow *et al*., 2008; Corley *et al*., 2015). This disconnect or resistance has been rationalised by Cushion *et al*. (2003) as elite coaches *accepting* the concept of 'PA feedback usefulness' in theory, however, finding that the content is actually *divorced* from their environmental reality and so ultimately is not used. Thus, developing a system in which PA would be implemented more effectively to benefit the coaching process, there is a considerable desire to reduce this *divorce* rate amongst applied practitioners (Bryant *et al*., 2018).

Whilst there are a number of articles that support the useful integration of PA and feedback and subsequent improvements that it *could* make in sport (Carling *et al*., 2005; Corley *et al*., 2015), limited research has actually implemented these research recommendations in the real-world applied setting, such as in football. So there is a clear gap in the research knowledge determining effectiveness of the PA system design and processes within real-world applied elite sport environments. Specifically, a design that incorporates 'how and what' PA material is actually provided back to the athletes (Giblin *et al*., 2016)**.**

Action Design Research (ADR) is a recent method of systems research. Its focus is on creativity in the design and construction of artefacts that have a place in applied environments (football coaching) (Chatterjee & Hevner, 2010; Herfridsson *et al.*, 2011). Artefacts can be methods (for example, feedback to players) and constructs (Hevner *et al*., 2004). ADR is described as a problem-seeking paradigm, which allows for innovative ideas and applied practice, so enabling football performance information to be effectively and efficiently fed back to players (Karmokar, 2013). The typical design of an ADR system is: problem identification; objectives of a solution; design and development; demonstration; evaluation and communication (Peffers *et al*., 2006). ADR systems draw upon participant interaction (football players and coaches), as well as the system design and build focus. Therefore, the ADR system may be an effective design method to research development and application of PA feedback in football. However, it is a new framework and therefore the current application of the model in sport is limited. The multidisciplinary approach to PA in football by Glazier (2010), suggested that the data collected to inform PA feedback focused on the technical, tactical and physical aspects of performance.

Frequently this data is collated via computerised multi-camera tracking systems, such as Prozone (Bradley *et al*., 2016) or OPTA (Liu *et al*., 2016). Both systems are known to be internally robust with high levels of validity and data accuracy (Di Salvo *et al*., 2006; Bradley *et al*., 2007). Performance indicators include possession. However, between systems there are large discrepancies in the reliability of the data recorded. This is due to the use of differently defined performance indicators, collection methods and standardised typical error (Liu *et al*., 2016). In elite football, coaches cannot therefore rely solely on this computerised output to provide individualised feedback and often are required to edit or add other sources of data. Computerised systems are limited in their value to elite football coaches, as they lack this detail on the individual, match and team playing-model specificity, which is essential in effective player feedback (Tunaru & Viney, 2010; Sarmento *et al*., 2014). Although football teams share common tactics and systems, no two football teams play the same way. Therefore, any performance indicators or combination of performance indicators, need to be carefully selected based on what is most important to the team and the way they play (Bradley *et al*., 2016).

At the elite level of football analysis in New Zealand, the performance feedback data is enhanced using variables collected via Sportscode Elite (V11, Hudl, USA). Variables include:

- Strength of team and opposition, match outcome and match location (Liu *et al*., 2016), field position and team quality (Bush *et al*., 2015);
- Probability of scoring a goal or contributing to a goal in each part and moment of the game (Szczepański, 2008);
- Position specificity (James *et al*., 2002);
- Inter-unit (defence, midfield, forward) influence on effectiveness in the game (Taylor *et al*., 2005);

- How players adapt when they switch position during a match (Bradley *et al*., 2013; Schuth *et al*., 2015);
- Situational (home/away) (Castagna *et al*., 2003);
- Pitch surface (Taylor *et al*., 2005; Tucker *et al*., 2005);
- Match status (Lago & Martin, 2007; Redwood-Brown, 2008).

This research aims to investigate the development of the NZ Player Effectiveness Analysis System (PEAS), using an ADR system design framework enabling coaches to provide impactful and individualise performance feedback to elite NZ footballers.

METHOD

Design

The research implemented an ADR framework to construct an innovative and effective feedback system for football players (artefacts) in applied practice. The design used the six phases of ADR framework of: problem identification, objectives of the solution, design and development, evaluation and communication.

Sample

The study population included only New Zealand participants (N=4) that had participated in the 2016–2018 national women's football team. The frequency of key performance actions for each player were coded: *Technical skills* of receiving (11), passing (10), dribbling (4), defending (10), crossing (8), shooting (7) and goal (3); *Tactical actions* of attacking set plays (13) and defensive set plays (13).

Ethical clearance

Informed consent was obtained from New Zealand football. Ethical clearance was also acquired from the Ethics Committee of the Auckland University of Technology to undertake this study (16/375).

Procedures

In total, 21 matches were observed during the 2016–2018 seasons. All player effectiveness variables were coded using Sportscode Elite (Hudl, USA). The variables coded were:

Receiving

- *Touch Forward* – receiving touch moves the ball in a forward direction when the player is already facing forward;
- *Turned* – player receives the ball and turns to face forwards in a maximum of two touches;
- *Touch Backwards* – receiving touch moves the ball in a backwards direction;
- *Sideway*s – receiving touch moves the ball in a sideways direction;
- *In Behind* – player receives the ball between opposition defence and goalkeeper;
- *Other* – when the player's receiving touch or intentions cannot be identified;
- *Open Out* – receiving touch moves the ball sideways in the same direction as the pass;
- *Aerial* – ball is received above knee height;
- *Under Pressure* – ball is received when the opponent is in close enough proximity to affect the receiving touch;

- *Retain* – receiving touch allows the player to perform another attacking act;
- *Loss* – player's receiving touch results in possession being lost.

Passing

- *Sideways* – pass to a teammate 30 degrees in front or behind the ball;
- *Forward* - pass to a teammate outside of sideways range, and does not fit into any of the below categories;
- *Backwards* – pass to a teammate backwards outside of sideways range;
- *Switch* – pass to a teammate that skips out a vertical quarter of the pitch;
- *Penetrating* – pass to a teammate beyond a midfield or defensive line;
- *Behind Back 4* – pass to a teammate behind the opposition defence;
- *Flick On* – ball is touched in a forwards direction by the players head;
  - *1 Touch* – pass is played in one touch (this is also classified as a receive);
  - *Retain* – pass is received by a teammate;
  - *Loss* – pass results in a loss of possession.

Dribbling

- *1v1* – Player attempts to dribble past an opponent;
- *Dribble into space* – Player dribbles into space in front drawing opposition player or forcing them to retreat;
  - *Successful* – Dribble allows the player to perform another attacking act;
  - *Unsuccessful* – Player loses possession of the ball before completing the dribble.

Defending

- *Tackle* – Competing for ball from direct opponent's touch;
- *1 v 1* – Opposition player attempts to dribble past player;
- *Intercept* – Stopping ball from reaching its intended recipient;
- *Regain Loose Ball* – Gaining possession of the ball that does not fit into any other category;
- *Clearance* – Relieving pressure on the goal from an opposition attack;
- *Header* – Aerial challenge against an opponent;
  - *Block Cross* – Player using their body to block a cross from an opponent;
  - *Block Shot* – Player using their body to block a cross from an opponent;
  - *Successful* – Player wins possession, challenge or stops the immediate danger caused by the opposition;
  - *Unsuccessful* – Player does not win possession, challenge or stop the danger caused by the opposition.

Crossing

- *From Deep* – Ball is crossed behind the line of the 18-yard box;
- *18 Yard Box* – Ball is crossed between the 6-yard and the 18-yard boxes;
- *Goal Line* – Ball is crossed between the 6-yard box and goal line;
  - *Low* – Ball is crossed below waist height;
  - *Lofted* – Ball is crossed above waist height;
  - *Cut Back* – Ball is crossed backwards more than 45 degrees;
  - *Successful* – The cross is received by a teammate;
  - *Unsuccessful* – The cross is not received by a teammate;
  - NB: If out for corner = unsuccessful cross – win set play.

Shooting

- *1v1* – Player advances towards goal directly confronted by the goalkeeper;
- *Inside Box* –Shot is within the 18-yard box;
- *Outside Box* – Shot is outside the 18 yard box;
- *From Cross* – Shot is taken direct from a cross;
- *Blocked* – Shot is blocked by a player;
  - Successful – Shot results in a goal or goalkeeper parry;
  - Unsuccessful – Shot does not result in a goal or goalkeeper parry.

Goal

- *Scored* – Player that scored the goal;
- *Assist* – Player that completed the attacking act that led to the goal scorer receiving the ball;
- *Assist the Assist* – Player that completed the attacking act that led to an assist.

Attacking Set Plays

- *Long Range Free Kicks* – Free kick outside the attacking quarter;
- *Wide Free Kicks* – Free kick within the attacking quarter between the 18-yard box and the touchline;
- *Corner* – A corner;
- *Central Free Kicks* – Free kick in the attacking quarter within the width of the 18-yard box;
- *Win* – Player wins an attacking set play in the attacking third;
- *Win 1st Phase* – Player that makes first contact with the ball from a set play;
- *Win 2nd Phase* – Player that makes second contact with the ball from a set play in the attacking quarter;
  - *Successful* – Win either the 1st or 2nd phase;
    - Short Corners – Leads to a cross or shot;
    - Central Free Kicks – Shot results in a goal or goalkeeper parry;
  - *Unsuccessful* –Does not win the 1st or 2nd phase;
    - Short Corners – Does not lead to a cross or shot;
    - Central Free Kicks – Shot does not result in a goal or goalkeeper parry.

Defensive Set Plays

- *Long Range Free Kicks* – Free kick outside the attacking quarter;
- *Wide Free Kicks* – Free kick within the attacking quarter between the 18-yard box and the touchline;
- *Corner* – A corner
- *Central Free Kicks* – Free kick in the attacking quarter within the width of the 18-yard box;
- *Concede* – Player concedes a set play in the defending third;
- *Win 1st Phase* – Player that makes first contact with the ball from a set play;
- *Win 2nd Phase* – Player that makes second contact with the ball from a set play;
  - *Successful* – First contact is made by our player or goes out of play;
    - Short Corners – Does not lead to a cross or shot;
    - Central Free Kicks - Shot results in a goal or goalkeeper parry;
  - *Unsuccessful* – First contact is made by an opposition player;
    - Short Corners – Lead to a cross or shot;
    - Central Free Kicks – Shot results in a goal or goalkeeper parry.

The ADR framework of the analysis system began with creating Individual Performance Plans (IPPs) through collaboration between each player and coaching staff (ADR Phase 1 problem identification). Then specific individual areas were targeted for each player with a definition for each variable (ADR Phase 2 objectives of a solution). The results where then communicated to players as graphs displaying trends over time (ADR Phase 4 demonstration)

Action design research

ADR Phase 1: Problem identification – IPP development

Performance profiling provided a way to understand how players rated the qualities necessary to achieve top performance and how they currently assessed their own performance and ability against these. This was a key driver in this developmental stage.

The first step was sending the players their observed positional breakdown using the effectiveness variables collected via Sportscode. This positional specific breakdown included a technical/tactical, physical, psychological and social/emotional section. Only the technical/tactical section was position specific with the others used to identify separate or contributing areas that could be barriers to performance. Each player's individual plan often has multiple strategies designed to achieve the same goal (Table 1). With access to experts from a variety of fields (sports medicine, physiotherapy, nutrition, massage, sports science, physiology, psychology, life planning, performance analysis and football coaching) the goals outlined in the players' IPPs are worked towards using a multidisciplinary approach. However, only those related to technical aspects were included in the analysis system.

***Table 1*. EXAMPLE OF INDIVIDUAL PLAYER PERFORMANCE PLAN**

Player	Priority	Performance goal	Strategy	Measurement	Action plan	Person responsible
Player A	1	Improve goal scoring	Improve shooting technique	Increase number of successful shots	#Additional training X3 per week with goalkeeper. #Set goal each session to shoot more often.	Coach
		Improve goal scoring	Improve speed over 10m	Improve speed testing results	#Increase leg exercises in weights programme. #1 X extra speed session per week.	Strength and Conditioner
		Improve goal scoring	Reduce skinfolds	Reduce sum of 8 score	Redesign eating plan	Nutritionist

ADR Phase 2: Objectives of a solution

The players and coaches then each separately completed an IPP document. Rating both the importance of each area and the ability of the player in this area (Table 2). Both documents were then compared by an independent expert observer. This design ensured independency

between the coach rating and the player self-rating scores. The design enabled the objectives to be determined through identifying where discrepancies occurred in ratings or where performance gaps exist. A simple colour coded system was automatically generated where cells highlighted in blue identify where the inconsistencies occur and cells highlighted in red recognise where the performance gaps exist (Table 3). This generated discussion points between the coach and the player on the final ratings and then the creation of objective player priority areas.

***Table 2*. RATING SCALE**

Rating scale	Importance	Ability
3	Extremely important	Gold Medal
2	Very important	Highly skilled
1	Quite important	Proficient
0	Important	Skilled
-1	Slightly important	Competent
-2	Hardly important	Low ability
-3	Not important	No ability

For each of the priority areas identified, a goal was set for the player to achieve. The required number of strategies were then devised for the player to achieve these goals utilising the multidisciplinary support. For each strategy, the appropriate measurement was detailed for the coach and player to be able to track progress being made. An action plan was then designed detailing exactly what the player will do to achieve the desired goal. These action plans were individualised for each player. Then a staff member was allocated to each individual to assist in aiding the player to achieve her objective.

Specifying the staff member responsible gave increased support to each player. It is important to note that not all goals and strategies were measured objectively using the ADR system. Actions that did not directly involve interactions with the ball were not measured and subjective analysis was then used to evaluate progress. Areas away from the pitch (fitness testing) were measured separately but still integrated into the player strategy to achieve her goals (Table 3).

ADR Phase 3: Design and development of analysis system

Careful consideration was given to the steps required to construct the PEAS to ensure its validity and relevance to the NZ Women's team playing-model (Figure 1).This system meets the requirements of this project as the measurements were playing model specific and took into account all members of the team, who were executing the NZ Women's team playing-model. Incorporating the significant individual player contribution developed from ADR Phase 1 and Phase 2 stages were key strategically to ensuring the players responded to the PEAS positively.

Table 3. **EXAMPLE OF AN INDIVIDUAL PERFORMANCE PLAN**

	Technical/Tactical [Consider-Recognition, Decision, Pace, Accuracy, Timing, Both Feet, Consistency]	**Importance**			**Ability**		
		Player	***Coach***	***Mean***	***Player***	***Coach***	***Mean***
	Support						
1	Provides width and correct height to maintain possession/support attack	3	2	2.5	2	1	1.5
2	Overlap/underlap to provide attacking support	3	2	2.5	3	1	2.0
3	Provide passing option on opposite of pitch for switch of play	2	2	2.0	1	-1	0
	Receiving						
4	Receive passes on ground into space or away from pressure	3	2	2.5	3	1	1.5
5	Receive aerial passes into space or away from pressure	3	1	2.0	1	0	0.5
6	Receive with open body shape	3	2	2.5	1	-1	0
7	Vision and awareness - quantity and quality of looks	3	2	2.5	-1	-1	-1.0
	Passing						
8	Pass backwards to centre back or goalkeeper to avoid being locked in	3	1	2.0	2	1	1.5
9	Pass square to deep player (to open out or play forward)	3	2	2.5	1	-1	0
10	Pass forward to allow players to turn	3	2	2.5	1	-1	0
11	Pass forward to players being marked	2	2	2.0	0	0	0
12	Lofted pass dropped in between units	3	1	2.0	0	0	0
13	Pass behind back 4	3	2	2.5	1	1	1
14	Pass with disguise	3	1	2.0	-2	0	-1.0
	Crossing						
15	Crosses from deep	2	1	1.5	-1	-1	-1.0
16	Early crosses	3	2	2.5	-1	-1	-1.0
17	Crosses from touchline	3	2	2.5	2	1	1.5
18	Crosses under pressure	3	2	2.5	1	1	1.0
19	Outswinging crosses	3	2	2.5	1	1	1.0
20	Inswinging crosses	3	1	2.0	1	1	1.0
	Dribbling						
21	Drive inside to exploit space and/or create overloads	3	2	2.5	1	1	1.0
22	Take on opposition player	3	2	2.5	1	-1	0

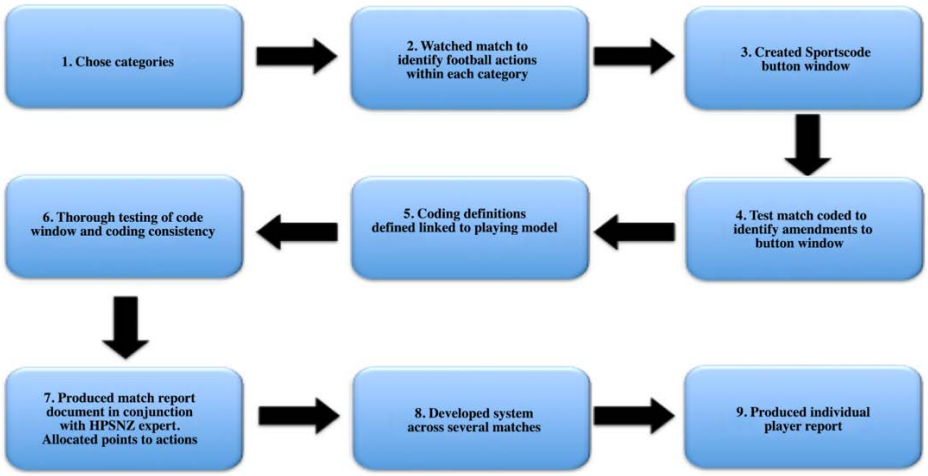

Figure 1. **PEAS DEVELOPMENT PROCESS**

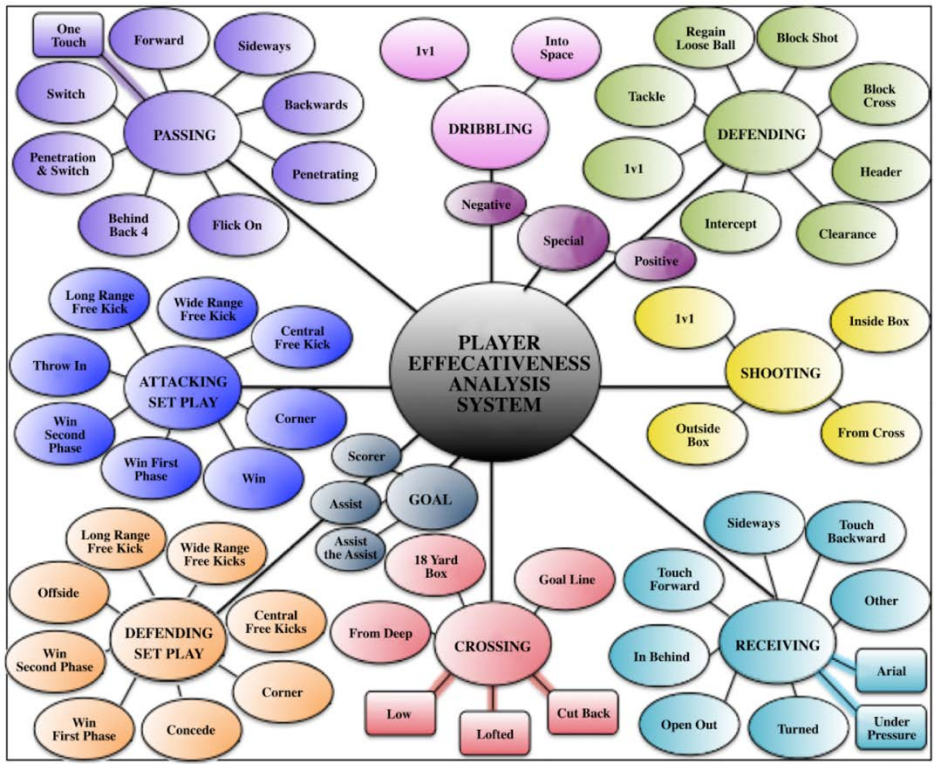

Figure 2. **FOOTBALL ACTIONS FOR PEAS**

The first step in designing the PEAS was the identification of the categories of actions to be coded. The actions to be coded was agreed after discussion between the NZ Coaching staff and NZ analyst (Figure 2). Each action was then coded for each player from the 21 international matches as either successful or unsuccessful. This was then used to attribute points for each player's Player Effectiveness Score (PES). To restrict the subjectivity of the analysis and ensure validity and relevance to the team playing-model, the coaching team constructed simple definitions for each football action. To check the reliability of the system, intra-class correlation coefficients were calculated for each action variable (1.00; 95% confidence interval: 0.99, 1.00), indicating excellent reliability (Koo & Li, 2016).

The PEAS then exported the coded data directly into an excel database for each player. A score was allocated to each action to calculate each player's overall player effectiveness total. Points were accumulated or deducted depending on whether the player's actions were successful or unsuccessful. The system provided the following individual feedback information for each player and each match:

1. Individual player effectiveness across all matches – player specific;
2. Match reports detailing the effectiveness of each player per match – match and player-specific;
3. Team report breaking down the team's effectiveness points across all matches – match and team-specific;
4. Individual player report.

ADR Phase 4: Demonstration

The objective data revealed a mixture of results in the desired individual performance areas. Figures 3-6 provide examples of different players' performance tracking against goals in their respective IPPs. With the opposition strategy largely influencing the quantity of some of desired actions (turning back 4 against a team that defends deep), a trend line was introduced to provide a more reliable representation of progress over a period of time. The PEAS was used to identify which of the IPP goals were successful or not and subsequent discussion then took place at the completion of the IPP period to determine the reasons.

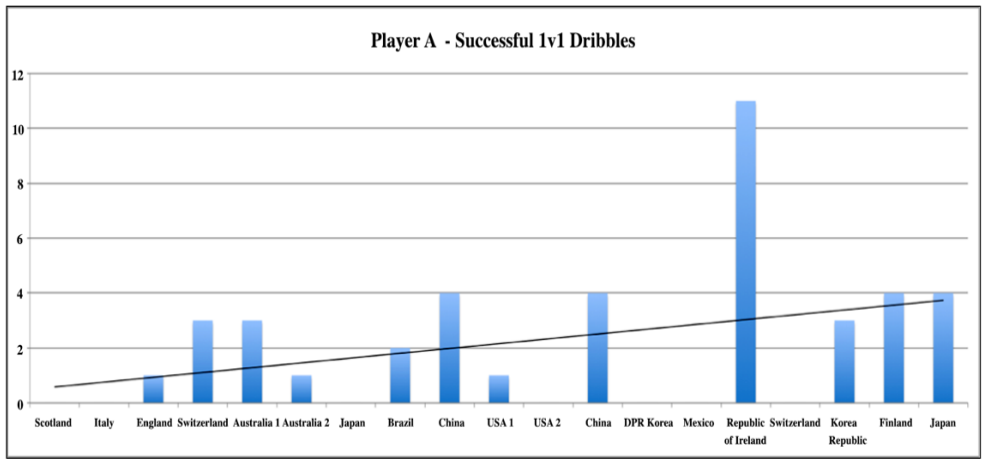

Figure 3. **PLAYER PROGRESSION IN 1 vs. 1 DRIBBLES**

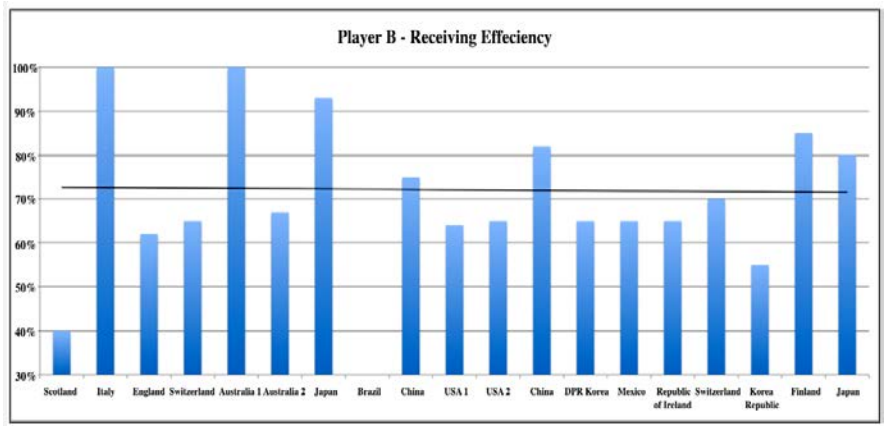

Figure 4. **PLAYER PROGRESSION IN RECEIVING EFFICIENCY**

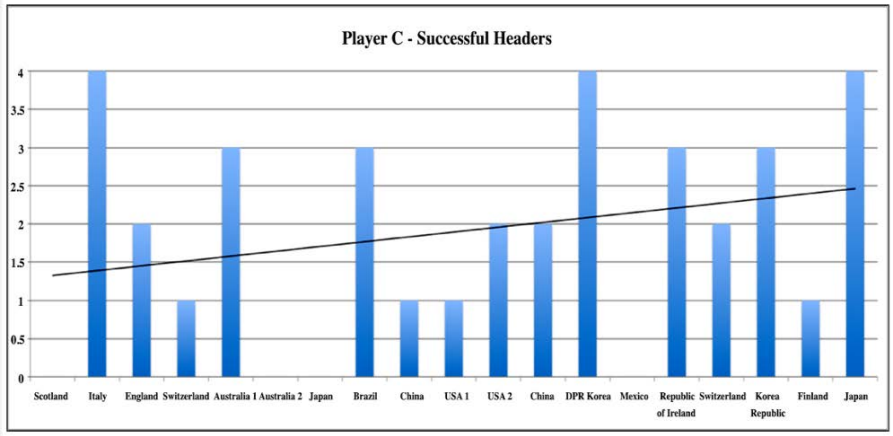

Figure 5. **PLAYER PROGRESSION IN SUCCESSFUL HEADERS**

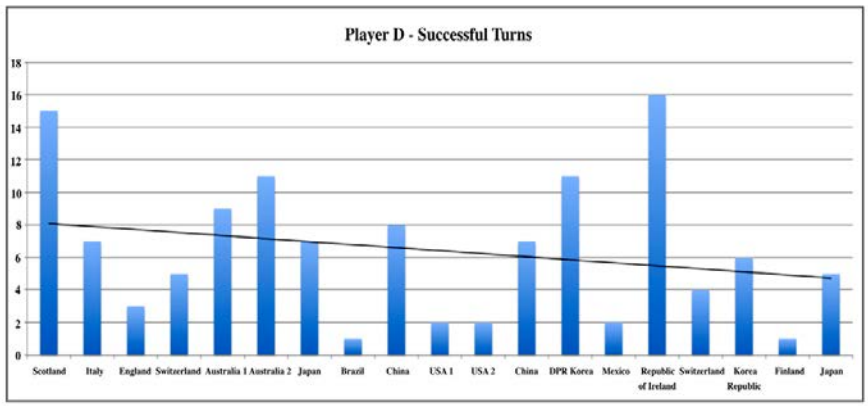

Figure 6. **PLAYER PROGRESSION IN RECEIVING AND TURNING**

The demonstrations that were shown to the players and coaches (Figures 3-6) showed the effectiveness of the PEAS system to highlight the differing results for individual player. In these examples, two players improved their success level, one maintained their performance level and one reduced their success level. This demonstration phase emphasised a key benefit of the PEAS in its ability to track players in different variables over time. The coaches felt that the PEAS would therefore provide important information as to whether training methods were individually appropriate or needed to be amended to suit individual needs.

The demonstrations in Figures 7-8 indicate the overall PES scores over time. These scores show the progression of players in all areas, rather than just their specific development areas. These results provided the coaches and players with an overall analysis of their performance, as opposed to just one area of the game. Furthermore, the results show that the performance of the team does not necessarily affect the performance of the individual with players varying greatly across different games. However, the team performance can have an impact, with both players' highest scores being in the same game.

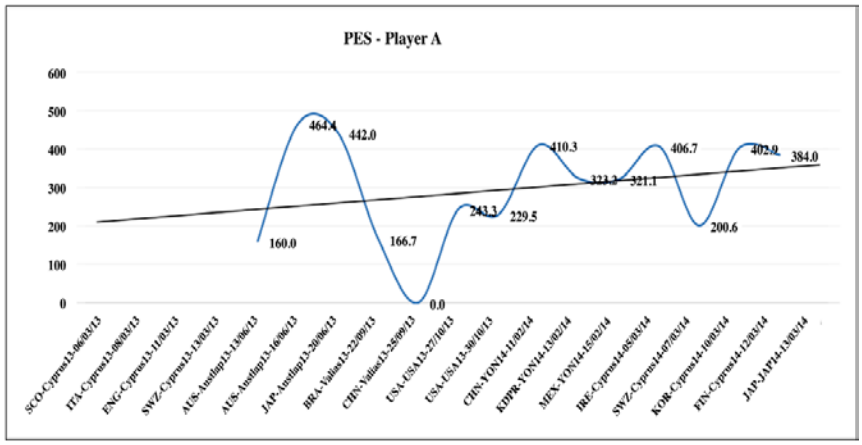

Figure 7. **PLAYER A: PES SCORE**

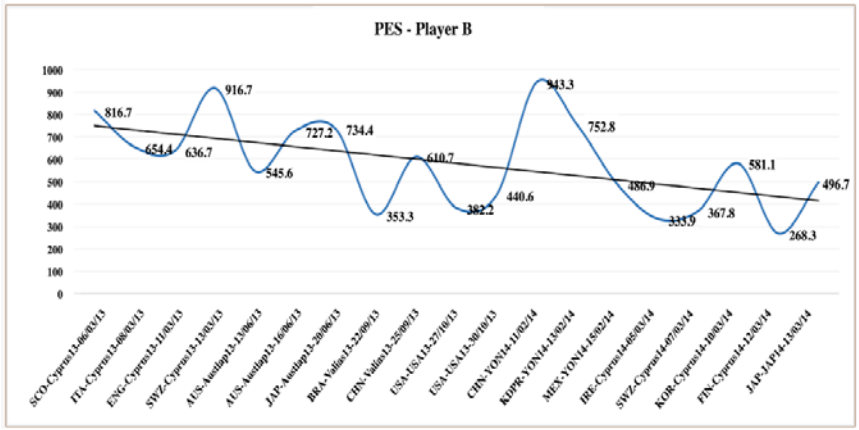

Figure 8. **PLAYER B: PES SCORE**

Figures 7-8 highlight the large differences in PES scores across positions. Player A (centre midfield) has a much lower score than Player B (centre back) consistently, showing that centre backs are performing more or higher-scoring actions across the matches. This rules out the possibility of comparing the players in different positions against each other using the PES system, as there will be large differences in scores no matter what the performance.

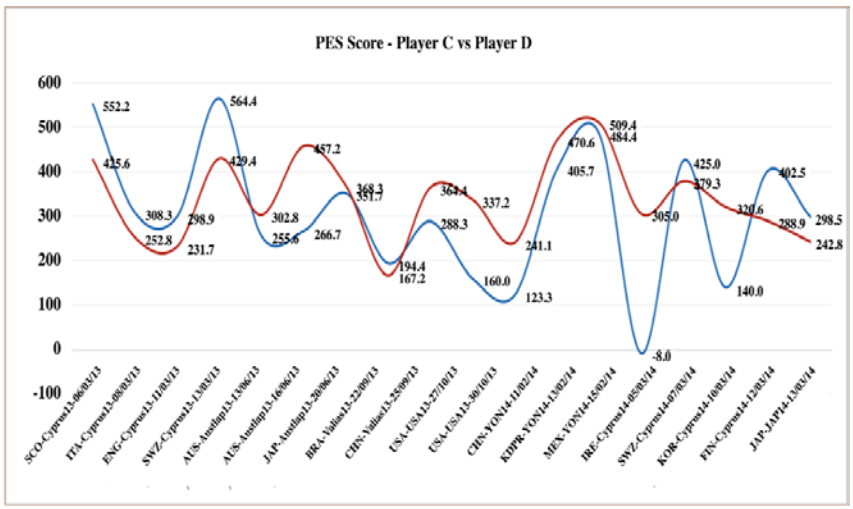

Figure 9. **PES SCORE: PLAYER C vs. PLAYER D**

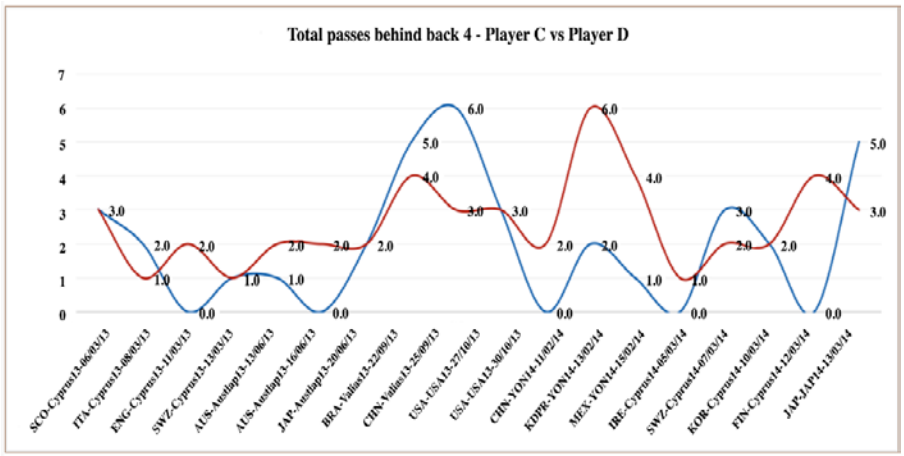

Figure 10. **TOTAL PASSES BEHIND BACK 4: PLAYER C vs. PLAYER D**

However, players may be compared position to position as seen in Figure 9, as they will have the same factors impacting on them. This allows analysis to be completed player to player for overall PES scores, as well as individual performance variables (Figure 10).

ADR Phase 5: Evaluation

The PEAS was used to measure objectively each player's individual performance over the past 21 matches and effectiveness of the IPPs. Over this period the team produced its best ever results in terms of total number of wins and success against the highest level of opposition. Increases in performance levels by individual players played a substantial part in this, which was clearly identifiable through the use of the PEAS. This system has provided both coaches and players with clear and accurate objective data to assess the progression in performance of each player towards their IPP goals.

The PEAS system developed over time and continued enhancements were made to ensure its reliability and validity. This included the refinement of the points scoring system. Attributing points to each action was based upon two factors, namely the importance of the football action in the context of the game and the importance of the football action in successfully executing the team playing model. The latter was a very important consideration to maximise the PEAS specificity to the playing model. It was foreseen that over time the points attributed to each action would need be refined, however, the system was designed to enable these changes to be applied to all matches to ensure consistency.

Adaptability to players not playing full matches was built into the system. The statistics may be misleading due to the reduction in game time, a formula was therefore written into the system that calculated the total number of points that would be accrued, if the player had been involved for the full 90 minute duration.

The PEAS provided valuable information for both players and coaches as to the effectiveness of their performance for either a single match or over a period of time. The PEAS provided an efficient tool to track the progress and improvement of the technical/tactical goals set out in each player's IPP in ADR Phase 1.

Players having a greater understanding of their role within the team playing model (Weston *et al*., 2011). The skills at their disposal to execute it successfully are vital components of the team achieving success. The PEAS has provided clarity for players on their role, and an objective system to measure it. The PEAS is now in a position where it is robust enough for the overall player effectiveness score to objectively influence team selection decisions. The individual player report also provided each player with useful objective information for them to target areas to improve through the intra position comparisons. These findings will help identify areas for inclusion in future IPPs.

Awareness is the fundamental component that negatively or positively influences player development (Mills *et al*., 2012). The PES system clearly showed how players develop in their specific IPP area, and players were able to evaluate their performance in each match or over a period of time. This has led to increased accountability and responsibility, increasing the likelihood that players would analyse their performance to assess their strengths and areas for development (Weston *et al*., 2011).

The ADR system development has created the specificity that was translated into increased performance over this period, while the other players (that have not used the PEAS) have been made aware that they need to alter their training performance. The most important outcome of the PES is that it allows the players not improving to be made aware of this, when in the past they may have just continued the status quo with no alterations to their training programme.

One area that requires further improvement is the total PES score for each player. This varied greatly position to position, with defenders having far higher scores than attackers. This is consistent with past research where there are similarities in percentage of successful outcomes, but not in frequency between positions (Taylor *et al*., 2005). To further enhance the value of the PEAS, each position should have a weighting scale attributed to it so that players can be compared position to position to establish the most effective players in the team, rather than in just one position.

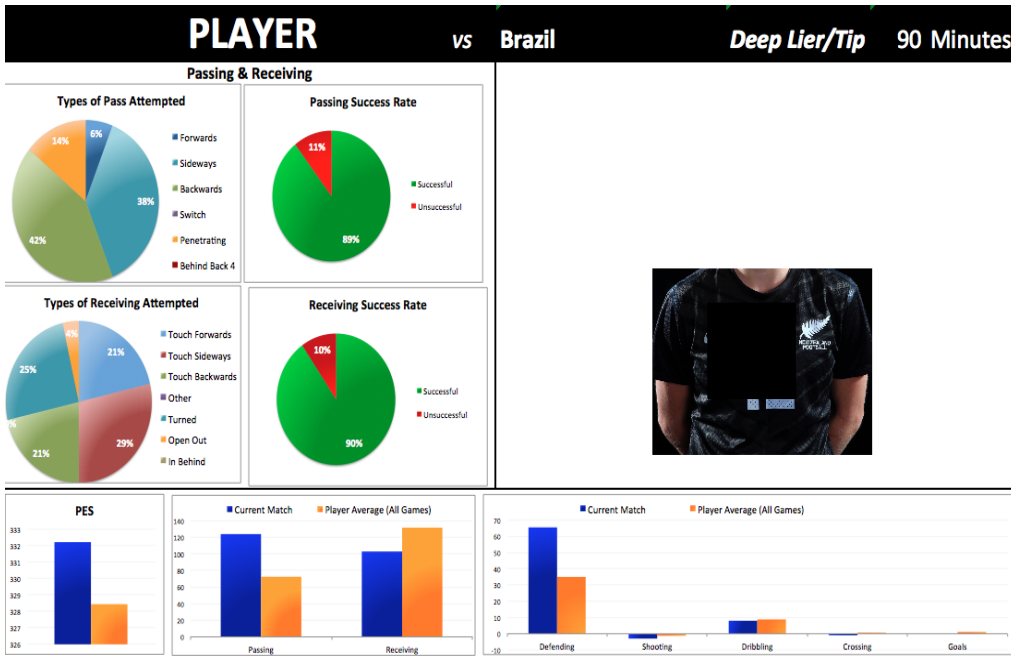

Figure 11. **COMMUNICATION DASHBOARD TO PLAYER**

ADR Phase 6: Communication

Over time, the whole system was refined and enhanced and regular checks made by coaches to ensure the accuracy and reliability was at the desired level. The final step was to create an individual player report that provides for the following for each player (Figure 11).

1. Breakdown of individual player performance in every match and effectiveness score;
2. Graphs breaking down their football actions;
3. Comparison against the player's average in all matches;
4. Comparison against the player's average this year;
5. Comparison against team average in each match;
6. Comparison against team average this year;
7. Comparison against position average in each match;
8. Comparison against position average against specific opponents.

The developmental stages undertaken ensured that the desired objectives of the PEAS were successfully achieved. In addition, this work provided benefits beyond these areas in terms of creating a shared playing model, increasing communication levels and education of both coaches and players. Ensuring the players were involved and contributed throughout this project increased the likelihood of success and also created genuine buy in that was an essential component.

Specificity of this project towards the successful execution of the team playing model was a major consideration throughout. Documenting this, then breaking down each player's role within it was necessary to complete the next developmental stages and also ensure players had a deep understanding of what was expected of them. The ultimate creation of IPPs and the PEAS specific to the team playing model worked to improve performance and provides both coaches and players with the necessary tools to enhance future development.

Whilst there is much scope for improvement, the PEAS ensured training time was spent working more specifically in relation to the team's goals, regardless of the location of each player. It would not be possible for other teams to use all aspects detailed in this project in their own settings due to the specificity in its design to suit the playing model. However, there are some universal principles that could be taken and applied within each team's specific context.

CONCLUSION AND RECOMMENDATIONS

The successful achievements of this project have shown that this positive influence can be wide-reaching. Having tools of this nature available is a vital component and cornerstone of the planning, preparation, execution and evaluation of all aspects of individual and team performance. Although there is still substantial improvement to be made, the PEAS objectively measured relevant specific data, which allowed players to be tracked in every area and increased the team's chances of winning football matches. The IPP process provides the opportunity to ensure the position-specific actions are accurately aligned to the playing model.

Further work needs to be conducted to ensure that the goals set in each IPP are those that have the potential to have the greatest impact on performance. Such as amending the importance score of each action to ensure the most significant areas have the highest ranking. The IPPs focused on improving weaknesses and ignored players' strengths. The potential risk with this strategy is that it creates good *all-round* players but reduces each player's ability to carry out their unique match-winning actions. Improvements to IPPs should focus on both strengths and weaknesses to improve each player's all-round game and their distinctive threats.

Specific improvements to the PEAS system could include developing specific goalkeeper analysis, to set benchmarks comparing within team and between team scores; include off-the-ball actions and include a weighting based upon quality of the opposition.

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