The Perception and Value of Performance Analysis within Elite Academy Football: A Comparison between Phases

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Abstract

The originality of study ascertained coaches' engagement and integration of Performance Analysis (PA) practice across the Foundation (FP), Youth Development (YDP), and Professional Development (PDP) phases within elite academy youth football. Sixty-five (65) coaches (experience 5.5 ± 4.0) completed an online survey focusing upon their, utilisation and access to analysis tools, recollection and reflective practice, communication and professional relationship, and suggested improvements and current value of PA services. Likert scales (Always, Usually, Sometimes, Rarely, No Access) were used to facilitate comparison. Analysis was undertaken using Kruskal-Wallis and Dunn's post hoc tests to identify differences in response provision between academy phases. The engagement and integration of PA practices varied significantly across phases due to time, resources, and buy-in. PA usage progressed from FP to PDP, with greater integration and more sophisticated tools becoming prevalent towards the latter stages of a player's academy journey. Overall satisfaction with PA services was high, but clear improvement areas were highlighted, particularly around Independent Learning Plans (ILP) and the presence of analysts during training sessions across all phases. Despite the introduction of the Elite Player Performance Plan (EPPP), the study's significance highlights insufficient guidance on how PA should be distributed across phases. This has led to a disproportion of PA across phases with the potential benefits for the FP and YDP being under realised.

Key words: Performance Analysis, Academy Football, Youth Football, Coaches Perceptions, Coaching Process

Introduction

PA is a continually developing area within Sports Science, where published research has significantly increased over the past two decades.[1,2] The discipline has become widely accepted and highlighted as an essential pillar within the coaching process.[3-5] This has been mirrored in applied practice whereby a growing number of full-time performance analyst roles have emerged in elite first-team and academy football.[2,6-8] Throughout academy football, analysts contribute towards creating an optimal environment to develop talented youth players for a professional first-team.[9,10] Although this is essentially the main objective of a football academy, youth talent is also used as a mechanism to provide financial resources through player sales to reinvest where appropriate into the club.[11,12] Since the restructure of the academy system in 2012, academies have been distinguished into four classifications; Category 1 to 3 have registered players from FP (U9 to U11), YDP (U12 to U16) and PDP (U17 to U23), and Category 4 academies have a late development model which operates from U17 upwards. Objectives observed within the EPPP focus on player development areas FP (Under 9 – U11) "Learning to Love the Game", YDP (U12 – U16) "Learning to Compete", and PDP (U17 to U23) "Learning to Win". In that sense, the access to PA that an athlete may have at each phase may depend upon the objectives of the phase, financial resources and staffing structure at the club.[13] In addition, it is also dependent on the extent coaches are willing to implement PA within the player's development process.[14]

The limitations within human observation and recollection have highlighted only 30 to 50% of events during a game can be effectively recalled.[15-17] With this being a challenge, video-based PA offers a reliable and objective visual aid to support technical, tactical, and socio-psychological aspects of past and present performances.[18-20] This additionally emphasises the need for video-based PA to facilitate the identification of strengths and weaknesses within competitive performance, whereby an analyst can explore the wider context.[21,22] Generally, PA

workflows such as video feedback sessions are well accepted by youth players in academy football.[14,23-26] Although the implementation varies, PA allows enhanced alignment within the 'coaching process' which is often described as broad, messy, and non-linear.[27-31] It is commonplace that coaches and analysts work in tandem to feedback to athletes.[31,32] Studies have highlighted that coaches deem the coach-analyst relationship to be vital within the planning and preparation phase of the coaching process.[33-37] In contrast, some coaches felt under threat by performance analysts due to the perception that their own experiences and opinions would be devalued over time.[8,36,38] Arguably, coaches should consider and encourage the use of PA within the coaching process as it facilitates athlete/coach reflection, development, and aids decision-making[5,34,35,37,39,40]

PA feedback enables athletes to improve and retain tactical and skill knowledge of their own team or personal sporting behaviours.[23,41] When considering the style of PA feedback sessions, player-centred approaches have been found to be uncommon within elite football academy environments[26,42] with the primary approach being coach-centred.[35,43,44] However, an athlete-centred approach is suggested to maximise responsibility, develop ownership for self-learning, and foster elite decision makers[29,45,46] and its effectiveness has been highlighted recently within individual Olympic sports.[47-50] It is important to note that an athlete-centred approach can be employed far more easily within the Olympic setting due to the individualised nature of such sports for the most part.[47-50] Therefore, coaches and performance analysts should nurture varying methods of reflection, allowing athletes to independently review their own athletic performance.[26,51,52]

Research surrounding perceptions and values within elite English football is scarce with organisations unlikely to share information outside of their own club environment, due to the highly competitive nature of the sport.[53] Although Reeves and Roberts[54] focused on academy football through a case study approach, the extrapolation to other elite football settings is

challenging due to the different category levels (1-4) and age group (FP, YDP, PDP) nuances within each environment. Similarly, whilst Wright et al.[34,35,55] considered the integration and evolving role of PA, the differences between academy phases were not the focus. However, with the restructure of the EPPP in 2012 the demand for understanding the differences between the phases may not have been considered at the time compared to the modern prevalence of PA with academy settings. With the advent of increased PA provision within the sector, Andersen et al.[41] further acknowledged the importance of PA in elite Danish football, however, the work focused on comparing coaching badge level and thus there remains a lack of understanding or clear consensus regarding how coaches utilise PA across the distinct academy phases. Butterworth and Woodward[31] further highlight the large amount of information that can be utilised by the coach to support the coaching process but consider the challenge may be around the time and willingness the coach may have to integrate the relevant information to ensure effective impact.

The need to establish greater insight into the application of PA across all phases of elite English academy football settings appears warranted, to ultimately detail specific workflows that are perceived as essential at each phase. Therefore, the aims of this study are to ascertain coaches' engagement and integration with PA practice within academy football and review how this differs between the developmental phases (FP, YDP and PDP).

Methods

Participants

Sixty-five (65) coaches (coaching experience 5.5 ± 4.0) working within Category 1 (53.8%), Category 2 (20%), Category 3 (23.1%) and Category 4 (3.1%) professional football academy settings participated within the study. Most coaches were male (98.5%) and employed on full-time (58.5%) contracts. The coaches worked within the FP (27.6%, U9-U11), YDP (27.7%,

U12-U16), PDP (16.9%, U17-U23), or across two or more phases and therefore were categorised as Multiphase (27.7%, U9-U23). All participants were recruited via the professional business and employment-focused social media platform, LinkedIn (www.LinkedIn.com). The study was shared online, open to coaches who were based in the United Kingdom, working between the U9-U23 age groups, varying from category 1-4 academy settings. Ethical approval for the study was gained from a university's ethics committee.

Survey Design

The survey was based on current literature regarding the perceptions of PA practice within elite football settings.[34,35,41,54,56] The lead researcher collated a list of questions, with similar questions being removed or amended to fit the study aims and participant demographics. Two experienced practitioners from a coaching and PA perspective, who had greater than 10 years' experience within an elite sport setting provided critical reflection upon response items, wording, and question clarity in a similar manner to previous research.[47-50] The final survey consisted of 20 closed questions and 1 final opened ended question to allow participants to share any additional thoughts on improvements they would like to see within academy settings regarding PA practice. The survey was split into five main themes: 1) demographics, 2) utilisation and access to analysis tools, 3) recollection and reflective practice, 4) communication and professional relationship and 5) improvements and current value of PA services. In a similar manner to Nicholls et al.[48] and Wright et al.[35] Likert scale response items (e.g., Always, Usually, Sometimes, Rarely, No Access) were used to facilitate cross-phase comparisons.

Procedure and Data Analysis

The survey was completed at a time suitable for the participant via the online site, Google Forms. The survey was open throughout March 2022 and took 3 ± 7 minutes to complete. All participant's responses were imported into Excel as frequency counts and percentages in relation to each respective Likert scale item. Normality assumptions were assessed using the Kolmogorov-Smirnov test, identifying a non-normal distribution ($p < 0.05$). A Kruskal-Wallis test was used to identify differences in response provision between the four academy phases. Thereafter, post-hoc comparisons using the Dunn's test were undertaken with a Bonferroni correction to minimise the risk of Type I errors due to multiplicity testing. Statistical significance was set at $p < 0.05$ unless otherwise stated, with all analysis completed using SPSS (V27).

Results

Across all academy phases, 84.6% of respondents stated they had a dedicated PA department within their academy. Whilst examining the use of PA, no significant difference (p =. 06) was identified between the academy phases; however, a key and important trend was identified whereby the 1) utilisation frequency became more prevalent and 2) length of the box-and-whisker plot also narrowed as academy players progressed through the system (see Figure 1). It was found that fewer coaches use PA within the FP, in comparison to the PDP, where coaches 'always' use PA within their current role/workflow.

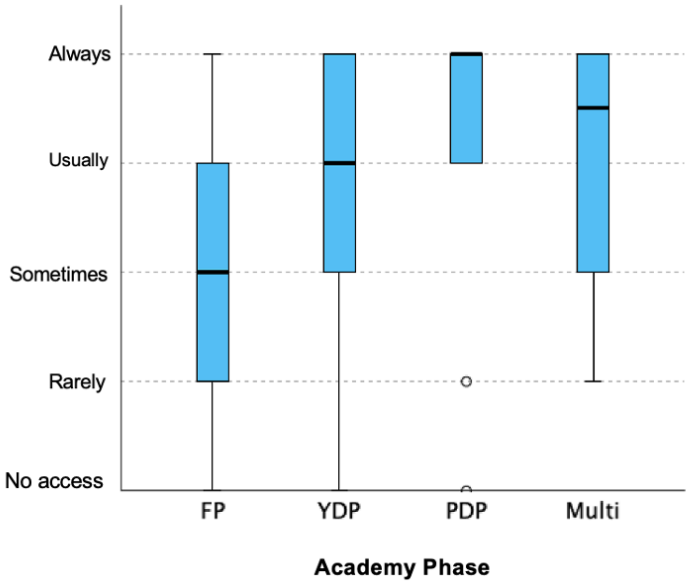

Figure 1. Coaches who use PA within their current role/workflow

When reviewing PA tool accessibility, Hudl Sportscode was identified as the leading industry software with 78.5% of coaches reporting that they had access. In addition, iCoda was commonly accessible in conjunction with Hudl Sportscode within the YPD and PDP. Telestration tools (e.g., Piero, Studio) were found to be accessible within the YDP and PDP but not within the FP in isolation. It was uncommon for such tools to be accessible or utilised within FP unless the coach worked across multiple phases, thus accessing via the older age group/phase. Across all academy phases, PA was utilised most frequently to inform the planning and preparation of individual player development, training sessions and player education. Most PDP coaches (54.5%) used PA to inform their planning and preparation of squad (age-group) goals, whereas it was utilised less within the YDP (38.9%) and FP (33.3%). Moreover, Pre-match planning and preparation was found to be non-existent within FP, however, within the YDP (33.3%), PDP (63.6%) and across the multi-phase coaches (44.4%), pre-match planning increased throughout the phases.

When reviewing half-time PA on match days, it was identified that only 27.7% of coaches were provided with this support. The phase that received this support most frequently

was the PDP (54.6%) and multi-phase coaches (38.9%). The coaches who received this support specified that they had support on set pieces, short clips of their own team and opposition, motivational videos and statistics/data outputs. Contrastingly, this workflow was found to be less common with the FP (16.7%) and YDP (11.1%) as some coaches were only provided with short clips of their team or the opposition at half-time.

The integration of training footage progressively increased from FP to PDP, with a significant difference ($p = .035$) indicating that it was more common in the PDP weekly workflow than in the FP (Figure 2). Generally, the majority (87.3%) of coaches chose to integrate/review footage of their training sessions and the remaining coaches (12.7%) either did not have access or chose not to integrate/review training session footage. Moreover, for FP and YDP coaches, the typical length of review per week was 1 hour 24 minutes and for PDP coaches, it was 2 hours 6 minutes. Across multi-phase coaches, the average weekly review time was 1 hour 42 minutes.

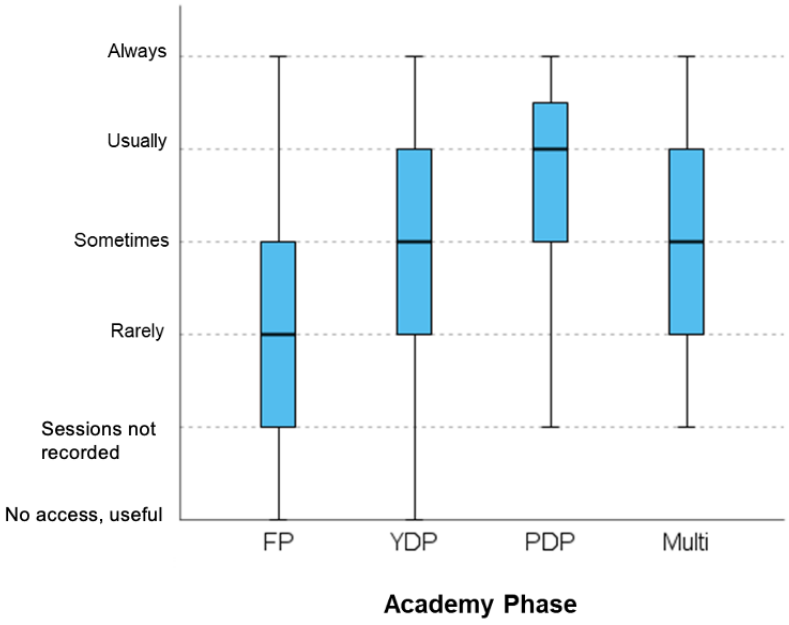

Figure 2. How often coaches integrate/review footage of their own training sessions within their weekly role.

The average time coaches encouraged athletes to review individual clips varied between the phases. It was found that 35.4% of coaches did not set out a set time frame for their athletes to review clips, but they did still encourage them to review. Contrastingly, all PDP coaches provided a review timeframe to their athletes, which was an average of 34 minutes. In addition, it was highlighted that a Category 1 PDP coach recommended their athletes link in their review of the whole game based on their club philosophy to create personal clips. Opposed to this, two coaches (FP/YDP) expressed that they did not encourage the review of individual clips, however, 20 minutes was the average time encouraged by other FP and YDP coaches to review individual clips. In addition, there was no significant difference (p =. 174) between the academy phases pertaining to how often coaches use video footage to reflect on their own coaching practice for personal development. Moreover, coaches also shared their views on whether having a good working relationship with the analyst(s) was valuable subsequently highlighting that the coach-analyst relationship was valued less by FP coaches compared to PDP, with 23% stating that they did not have a working relationship with the analyst. Contrastingly, all PDP coaches stated they had a positive working relationship with the performance analyst(s) and that they valued the relationship highly or extremely highly.

When reviewing the overall service that coaches received from their PA departments, it was found that coaches across all phases valued their PA service as 'High Quality'. Although PA services were valued, improvements were recommended to enhance the PA service further. Independent Learning Plan (ILP) enhancement within an academy setting was found to be a common improvement suggesting there could be more support from performance analysts with players around their ILP (Appendix 1). Another suggestion linked with ILPs was that preferably all players would receive individual clips rather than selected individuals, however, a shortage of staff resources was a barrier to this. In addition, the lack of training analysis was another significant area to improve PA services across the academy phases. This included

coaches wanting their performance analyst(s) to film and be around training more to facilitate identifying areas to work on within training. In addition, coaches believe that having the analyst(s) around training would create a more efficient and faster feedback process for the players (Appendix 1).

Discussion

The main objective of a football academy is to create an optimal environment to develop youth players for the first team, however, it is recognised that PA is a key and integral part of this process.[8,26] Since the EPPP was introduced, it is now a mandatory requirement that Category 1 clubs must employ a minimum of three full-time academy performance analysts and Category 2 academies must employ one full-time and one part-time analyst.[13] This likely explains why there has been increased number of full-time performance analyst roles in elite first-team and academy football across recent years.[8] The stipulation of the EPPP also highlights why 84.6% of respondents stated they had a dedicated PA department within their academy.

Moreover, fewer FP coaches were found to use PA, in comparison to the PDP coaches. This could be due to the availability of analysis staff to support sessions and player development, time athletes spend in the building, coach buy-in, and lack of practical or literature-based understanding of the application of PA at each phase.[49,57] It was uncommon for PA tools to be accessible or utilised within FP compared to the PDP unless the coach worked across multiple phases, thus accessing via the older age group/phase.[14,32] Smith et al.[58] highlighted how telestration tools (e.g., Piero, Studio) within elite football can reduce the time spent in video-based sessions as they can identify key topics more efficiently. Therefore, it can be argued that using telestration tools would be beneficial when educating younger players to enhance learning capabilities, allowing players to absorb higher amounts of technical, tactical, and socio-psychological information during analysis sessions.[26] Subsequently, Smith et al.[58]

and Jones et al.[59] highlighted the wider benefits of telestration to support learning within applied PA environments.

Although there are significant benefits when utilising PA tools[34], a common criticism recognised in football is that clubs have an inability to look past the short-term, resulting in some clubs having a reactive approach to decision-making. Wright et al.[34] concluded that 93% of coaches used analysis to inform short-term planning, which was the most used method compared to medium and long-term planning. Over a decade on, the current study identifies that 38.5% of all coaches utilise PA to aid and inform their short-term weekly planning. This highlights an area for development within academy football as planning could be more holistic across the season as it has been found that long-term planning can reverse failure and determine better strategies for performance. However, it is important to consider that long-term planning often takes more time for players to adapt to, before a strategy is effective. Across all academy phases, it was highlighted that PA is utilised most frequently to inform the planning and preparation of individual player development, training sessions and player education. However, from the suggestions to improve PA services, these were all key areas of continual improvement and focus to further enhance such services.

Looking specifically at workflows, pre-match planning and preparation were non-existent within FP, due to the focus within the EPPP player development areas: FP (Under 9 – U11) – "Learning to Love the Game", The YDP (U12 – U16) "Learning to Compete", and The PDP (U17 to U23) "Learning to Win". It is thought that pre-match is not an essential pillar to –"Learning to Love the Game" but is an essential workflow when looking to compete and win.[13] This supports why pre-match planning workflows increase throughout the phases as the assessment of performance begins to focus more on match outcome and becoming more competitive (YDP 33.3%, PDP 63.6%) compared to the developmental aspect within the FP.

Half-time PA on match days was most frequently utilised by the PDP (54.6%) and multi-phase coaches (38.9%) specifically around set pieces, short clips of their team and opposition, motivational videos and statistics/data outputs. Research supports the normality of differing half-time workflows due to personal preferences and philosophies that either the club or coach envisions working towards.[49] Depending upon what is presented at half-time, it is essential that the method of analysis is meaningful and easy for coaches and players to understand and implement in real-time match scenarios. Effective implementation of such information into live sporting environments is imperative as poor integration can have long-lasting ramifications such as a decrease in trust and buy-in from staff and players.[49,57,60]

It is also noted that the value of implementing and distributing technical and tactical detail is highly dependent on player age, maturation and match context relevance.[57] With the workflow being less common with the FP (16.7%) and YDP (11.1%), it is important to note players are still learning, developing and processing masses of new information where the implementation of in-game monitoring could be overwhelming, causing players to do things that they would not naturally do or take away the creativity element of the game. It can be justified that half-time analysis is a less essential workflow within the FP/YDP as the demands, positional expectations, and need to win are not as high within the development years compared to the PDP where the expectation to perform and compete is higher.[13,57,60]

The use of training footage integration progressively increased from FP to PDP where it was found the typical length of review time was 1 hour 24 minutes to 2 hours 6 minutes across the phases. It is important to note that there is no set time frame suggested in which coaches should review footage. However, it is understood that the hours need to happen in the background before the feedback or plan goes out to the players so that clear communication and outcomes are understood and achieved.[14,49,61] Despite the EPPP guidance surrounding required staffing numbers within each PA department[13], it does not specify where the

303 employees time should be spent, and therefore training session footage/analysis may have
304 become a less important component with certain clubs or phases. Within an academy setting,
305 it was found that there was a lack of understanding around the average timeframe coaches
306 should encourage athletes to review individual clips as it varied between the age phases. 35.4%
307 of coaches did not set out a set time frame for their athletes to review clips, but they did still
308 encourage the review process to the players. Wider research in PA does not provide a clear
309 direction here as Wright et al.[35] identified varying times, likewise Groom and Cushion[61]
310 suggested 30–40 min sessions was an adequate amount of time. In cognitive research, the
311 simple function of attention approximately starts to stabilise at 10 years of age[62], therefore until
312 players are past the age of 10 years old in academies, there should arguably be no set demand
313 or expectation on youth players to review clips. Similarly to training review time, there appears
314 no right or wrong timeframe to set out for athletes to review clips and the duration is solely
315 down to personal preference given the required learning objectives are achieved around the
316 identification of strengths and weaknesses of performance.[22]

317 The modern coach is now somewhat expected to work collaboratively to achieve
318 common goals, however, trustworthiness must be present for this to occur simultaneously.[63] It
319 was recognised that all academy PDP coaches who took part in this study stated they had a
320 positive working relationship with the performance analyst(s) and that they valued the
321 relationship highly or extremely highly. For an analyst to develop such relationships in their
322 workplace, they must 'prove themselves to their coach' by demonstrating sport-specific
323 knowledge, observing training sessions, travelling to away matches, and engaging in informal
324 conversations.[33-37] The coach-analyst relationship was valued less by FP coaches, where it was
325 identified that 23% of FP coaches did not have a working relationship with the analyst. The
326 knowledge that analysts must prove their worth begins to infer that if a dedicated full-time
327 analyst is not present at the FP/YDP age groups, then a negative impact on the perceptions of

PA (and the part-time analyst-coach relationship) could develop as the coaches may not experience how PA fully enhances the effectiveness of their own 'coaching process'.[29-31]

Future Research

Although the study has focused primarily on phase (FP, YDP, PDP) comparisons within elite English football, there is additional scope to compare significant similarities and/or differences of workflow applications and engagement across the category status of football academies. This would allow further investigation into the key recommendations (Appendix 1) provided around the workflow applications and explore the specific factors contributing to the lower usage of PA in the FP compared to the PDP. Additionally, there is a need for longitudinal assessment of the long-term impact of PA on player development and team performance. While current research highlights the use of PA for short-term planning, exploring how PA can be effectively utilised for medium and long-term strategic planning could provide valuable insights. Such research should consider how long-term planning utilising PA can enhance player progression across their academy journey and contribute to overall long-term team success.

The effectiveness of telestration tools, which are currently underutilised in the FP, warrants further exploration. Investigating how these tools can be adapted and implemented to support younger players' learning could potentially offer significant benefits in player development if time and resources allow. Comparative studies on the use of telestration tools across different phases and age groups could ascertain the impact on learning outcomes which could be particularly valuable from a teaching and learning perspective. Lastly, the coach-analyst relationship in lower academy phases is deemed less important compared to the PDP. Future studies should aim to ascertain how the presence and quality of this relationship affects the perceived value and effectiveness of PA. This could include examining the role of full-time

353 analysts, the methods to curate effective relationships, and the impact of this on the coaches'
354 perception and PA integration.
355
356 **Conclusion**
357 The study concentrated specifically on developing a deeper understanding of how PA is applied
358 across all phases (FP, YDP, PDP) of elite English academy football since the introduction of
359 the EPPP in 2012. The restructuring of the EPPP[13], as discussed in the work of Wright et
360 al.[34,35,55], may not have fully considered the exact differences between these phases at the time.
361 Key findings from this study revealed that the engagement and integration of PA practices
362 varied significantly across phases due to time, resources, and coach/player buy-in at each
363 phase. The research highlights the progression in PA usage as the end user moves from FP to
364 PDP, with greater integration and more sophisticated tools becoming prevalent towards the
365 latter stages of a player's academy journey. The overall satisfaction with PA services was high,
366 but there were clear areas where further improvements could be made, particularly around ILPs
367 and the presence of analysts during training sessions across all phases. Despite the EPPP's
368 provisional goals in 2012, there appears to be insufficient structure or guidance on how PA
369 should be distributed across each academy phase. This lack of direction has led to a
370 disproportion of PA across the academy phases with the potential benefits of PA for the FP and
371 YDP phases being underutilised. This study highlights the need for clearer guidelines from the
372 EPPP to ensure that PA services are effectively implemented and leveraged throughout all
373 phases of a player's developmental journey and career.
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Appendix 1: Participant Suggested Developments for Enhanced Performance Analysis Provision

Respondent	Category	Dedicated Analysis Department?	Value of Service	Improvements
Foundation Phase				
5	Category 3	No	Not applicable to me	Supporting the players to watch their clips to aid them with their individual action plans.
22	Category 1	Yes	High quality	Closer linking to the players ILP instead of just tagging set plays, more buy in from the analyst into the periodisation of training and positional changes for players based off match specific statistics
42	Category 2	Yes	Neither high nor low quality	Recording training sessions
45	Category 3	No	Neither high nor low quality	Filming of at least 1 FP session per week any age (rotate) and 1 FP match day per week
55	Category 3	Yes	High quality	Review of Coaching Behaviours
Youth Development Phase				
6	Category 2	Yes	Low quality	More footage of matches and training
17	Category 1	Yes	High quality	Observations of opposition's warm up, Some feedback during half time and Post match thoughts from their viewpoint of the pitch
25	Category 1	Yes	Neither high nor low quality	Help the coaches and players with clipping out moments for the players
30	Category 1	Yes	High quality	To provide clips showing areas we have worked on during the week linked to the weekly theme, this will save on time
53	Category 2	No	High quality	Break down analysis to attacking/defending/transition/set-play highlights
59	Category 1	Yes	Neither high nor low quality	Not relevant in lower age groups if YDP
61	Category 1	Yes	High quality	Happy with analysis provision but don't always get away games coded
62	Category 1	Yes	High quality	light on staffing, would like specifics coded too
65	Category 1	Yes	High quality	Match day clips for half time
Professional Development Phase				
31	Category 4	No	Neither high nor low quality	To record training, to provide quicker analysis of clips for the players use
55	Category 3	Yes	Neither high nor low quality	Develop his understand of the tactics, formations we play
63	Category 1	Yes	High quality	Probably to film more training sessions throughout the week with the drone as the footage is excellent
64	Category 1	Yes	Very high quality	Pitch mapping
Multi-Phase				
7	Category 1	Yes	Very high quality	More time around training to help identify specific areas worked on
15	Category 1	Yes	Very high quality	We would greatly benefit from having full-time analysts for each phase (FP, YDP, PDP)
24	Category 2	Yes	High quality	More IDP focus
43	Category 2	Yes	Neither high nor low quality	Focus more on practice opportunities over performance outcomes for younger players
49	Category 1	Yes	Very high quality	Coding all the areas of where goals were conceded in the goal and what type of entry into the area caused the goal