

Examining the impact of communication in the Performance Analysis Process on the Coaching Cycle

Conor Hoyne BSc

Student Number: A20350656

Supervisor: Dr. Stephen Behan

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Declaration

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Candidate: Conor Hoyne

ID No.: A20350656

Date: 04/12/2025

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Table of Contents

List of Tables	8
List of Figures	10
List of Abbreviations	11
Abstract	12
Chapter 1: Introduction	13
1.1 – Researcher Background	14
1.2 – Research Aims and Objectives	15
Chapter 2: Literature Review	17
2.1 Introduction	17
2.2 Performance Analysis as part of the Coaching Cycle	19
2.3 Communication in the Performance Environment	23
2.4 The Role of the Analyst in the PA Process	29
2.5 How PA is used to support Player understanding	33
2.6 Performance Analysis in Performance Sport	38
2.7 Performance Analysis in the GAA	41
2.8 Summary	43
Chapter 3: Match Day Coaching Communication, Performance Analysis, and Player Recall in Elite Youth Hurling: A Mixed Methods Case Study	45
3.1 - Introduction	45
3.2 – Research Methodology	50
3.2.1 - Study Design	50
3.2.2 – Participants	50
3.2.3 – Data Collection	51
3.2.3.1 - In-Game Communication	51

3.2.3.2 - Half-time Team Talk Analysis	53
3.2.3.3 - Post-match Player Recall Questionnaires	53
3.2.4 - Quantitative Data Preparation	54
3.2.5 – Data Analysis	55
3.3 – Results	56
3.3.1 – Player Questionnaires in Line with Game Context	58
3.3.2 – Coach Communication Tallies	59
3.3.3 - Half-Time Content Analysis	60
3.4 – Discussion	61
3.4.1 – Limitations	65
3.5 Conclusion	66
Chapter 4: Illuminating Match-Day Communication: Performance Analysis in Elite University Games	68
4.1 - Introduction	68
4.2 - Methodology	71
4.2.1 – Study Design	71
4.2.2 – Participants	72
4.2.3 – Data Collection	73
4.2.3.1 – In-game Communication Audio	74
4.2.3.2 Post-match analyst and observer interviews	74
4.2.3.3 Player interviews	74
4.2.4 Data Analysis	74
4.3 Findings and Discussion	75
4.3.1 Analyst Communication Tallies	76
4.3.2 – Reflective Thematic Analysis Table	79
4.3.3 – The Analysts Role Within Team Dynamics	83

4.3.4 – Epistemological Practice Gap Between Hurlers and Footballers	84
4.3.5 – Communication: Gaelic Football compared to Hurling	86
4.3.6 – Impact of Match Context on Communication	87
4.4 - Conclusion	89
Chapter 5: Conclusion	90
5.1 – Introduction	90
5.2 – Integrated Synthesis of Findings	91
5.2.1 – Communication Patterns Across Both Settings	91
5.2.2 – Alignment Between Coach Messaging and Player Perception	92
5.2.3 – Role and Positioning of the Performance Analyst	92
5.2.4 – Influence of Game Context on Communication and Analysis	93
5.3 – Contribution to Existing Literature	93
5.3.1 – Performance Analysis in Gaelic Games	93
5.3.2 – Communication and Feedback Within Applied PA	94
5.3.3 – The Analyst-Coach Relationship	94
5.4 – Implications for Practice	94
5.4.1 – Implications for Coaches	94
5.4.2 – Implications for Performance Analysts	95
5.4.3 – Implications for Youth Development Squads	95
5.4.4 – Implications for Third Level and Adult Amateur Environments	96
5.5 – Methodological Reflections	96
5.6 – Limitations and Future Direction	96
5.7 – Final Conclusion	99

List of Tables

Table 3.1 Example of data collected during match day and how it was recorded	51
Table 3.2 Types of Communication Examples from in-game comms.	52
Table 3.3 Operational Definitions used by Dublin u15 Hurlers for PA	54
Table 3.4 Time Spent on the Field of Play by Each Player During a Game	55
Table 3.5 5 Point Scale Used by Players to rank KPIs in Terms of Importance	55
Table 3.6 Detailed topics for each of the 5 KPIs	55
Table 3.7 Ranking Scale placed on each of the detailed topics	55
Table 3.8 Coach Communication Tally Table from Victory v Clare in a 60 Minute Match	59
Table 3.9 Coach Communication Tally Table from Loss v Wexford Across a 36 Minute Period Before the Dismissal of the Lead Coach	59
Table 3.10 Coach Communication Tally Table from Loss v Tipperary Across a 60 Minute Match	59
Table 3.11 Coach Communication Tally Table from Victory in Finals Game v Waterford Across a 50 Minute Match	60
Table 3.12 Half Time Content Analysis across all four matchdays	61
Table 4.1 Information on Analysts	72
Table 4.2 Information on DCU Fitzgibbon & Sigerson coaches	73
Table 4.3 Fitzgibbon Cup Analysts 1st Half Communications	76
Table 4.4 Fitzgibbon Cup Analysts Half-Time Communications	76
Table 4.5 Fitzgibbon Cup Analysts 2nd Half Communications	77
Table 4.6 Fitzgibbon Cup Analysts Total Communications	77
Table 4.7 Fitzgibbon Cup Team's Analysts Total Comms	77
Table 4.8 Sigerson Cup Analysts 1st Half Communications	77
Table 4.9 Sigerson Cup Analysts Half-Time Communications	78
Table 4.10 Sigerson Cup Analysts 2nd Half Communications	78

Table 4.11 Sigerson Cup Analysts Total Communications	78
Table 4.12 Sigerson Cup Team's Analysts Total Comms.	78
Table 4.13 Thematic Table	80

List of Figures

Figure 3.1 Mean importance ratings of the five KPIs across Games 1 to 4, with standard deviations presented as error bars	57
Figure 3.2 Mean importance ratings of the five KPIs in winning and losing games, with standard deviations presented as error bars	58
Figure 3.3 Consolidated presentation of the coach communication tallies from Tables 3.8 to 3.11	60
Figure 4.1 Thematic map of the themes and subthemes generated through the reflexive thematic analysis	82

Lists of Abbreviations

FRC — Football Review Committee

GAA — Gaelic Athletic Association

PA — Performance Analysis

SD — Standard Deviation

SPSS — Statistical Package for the Social

Sciences U15 — Under 15 age grade squad

Abstract

Examining the impact of communication in the Performance Analysis Process on the Coaching Cycle

Conor Hoyne BSc

Performance analysis has become central to coaching practice across a range of sports, yet the mechanisms through which performance information is communicated and interpreted within applied Gaelic games remain under explored. This thesis investigates how performance analysis functions as part of the coaching cycle within two distinct environments and examines how information shared by analysts and coaches is recalled and understood by players. The research focuses particularly on the nature, timing, and clarity of communication and how these factors relate to shared performance understanding.

A mixed methods case study approach was undertaken. The first study examined an Under 15 Talent Development inter county hurling squad. Match day communication was captured through live audio recording and this was supported by half time content analysis and post-match questionnaires that explored player recall of key performance indicators. The second study was conducted within third level Gaelic games programmes. Match day communication was again recorded in real time and complemented by interviews with players-and analysts to examine how performance information was delivered and received in more experienced performance settings. The interviews with players were conducted within 24 to 48 hours post-game depending on the availability of the player for interview. Generally they were conducted in person although in the case where face to face interview wasn't feasible they were conducted over the phone. Across the course of the study a total of 15 interviews were conducted with the Sigerson Cup players and 15 interviews with the Fitzgibbon cup players over the course of the Sigerson & Fitzgibbon Cup campaigns from November 2024 to February 2025. The analyst interviews were conducted immediately post-game as the analyst was leaving the pitch.

Across both contexts coaches favoured instructional communication and consistently emphasised a small number of performance indicators that aligned with their tactical aims. At youth level these messages were reflected increasingly in players perceptions across successive matches. In the third level environment players demonstrated a broader awareness of tactical information but continued to orient themselves around the central performance priorities communicated during games. The findings show that performance analysis is most influential when supported by clear messaging, shared understanding, and strong coach analyst relationships. The thesis contributes to existing literature by providing detailed evidence of performance analysis communication during live competition and by outlining practical implications for coaches and analysts working within Gaelic games.

Chapter 1: Introduction

Sport has become increasingly data informed, with the ability to capture, process and interpret performance information transforming how coaches prepare athletes, design training, and understand competitive performance (Lord et al., 2020). Subsequently, Performance Analysis (PA) plays a central role in shaping how sport is prepared for, practiced and understood (Francis et al., 2024). Yet while technology allows detailed insight into what happens during performance, far less is known about how this information is communicated and used by those within sporting environments (Corbett et al., 2024). This introduction outlines the background to PA, the challenges surrounding communication of performance information, and the specific context of Gaelic Games where this study is situated.

PA has become an increasingly prominent feature of sporting environments, particularly as technological developments have made access to video, coding software, and data collection tools more widespread across both professional and amateur settings (Young et al., 2020). Within Gaelic Games, the growth of performance analysis has been especially noticeable, with many teams now incorporating forms of video review, statistical reporting, and individualised feedback into their weekly routines (Brummer, 2019). While these tools continue to develop, the effectiveness of performance analysis ultimately depends on how well the information is communicated, understood, and applied within the coaching process (Martin, 2022; Nelson et al., 2023~~a~~). Analysis on its own does not improve performance; rather, it is the interaction between analysts, coaches, and players that determines whether information leads to meaningful change. While players need to trust the analyst in order to fully engage with PA (Nelson et al., 2023), there is clear evidence that provided they are not overwhelmed with information, that it is concise and easily digestible for them they will engage with PA as they recognise the ability it has to enhance their performance (Travis & Butterworth, 2024; Wright et al., 2016).

Although the discipline has its origins in notational systems and basic match charting (Hughes et al., 2008), performance analysis has evolved into a practice that is now deeply embedded in the wider coaching environment (Huggan et al., 2015). Analysts contribute not just by gathering information but by interpreting it, presenting it in accessible ways, and helping coaches and players make sense of key moments within games and training. This aligns with applied perspectives of performance analysis, which increasingly view the analyst's role as one that extends beyond technical expertise to include decision support, communication, relationship-building, and a broader contribution to the learning environment (Mackenzie & Cushion, 2013; Martin et al., 2021). In practice, the analyst acts as a bridge between raw performance information and the people who must use that information to guide behaviour.

Communication is central within this process. The literature consistently shows that the timing, delivery, and framing of feedback influence how well information is received and retained (Corbett et al., 2024; Nicholls et al., 2019; Smith & Cushion, 2006). Coaches and players differ in their preferences for how information is presented, and these preferences can be shaped by experience, familiarity with analysis tools, and the emotional context surrounding performance (Jones et al., 2020). Gaelic Games environments add further complexity, given the mixture of amateur and elite structures, varying levels of coaching education, and inconsistent access to analysis resources (Clear et al., 2017; O'Brien et al., 2021). As a result, communication between analysts, coaches, and players can differ significantly from team to team, with factors such as time constraints, training schedules, and organisational expectations shaping how analysis is used.

These applied realities frame the importance of understanding how performance information actually moves through the coaching cycle, from the analyst's initial observations, to discussions with coaches, to the ways in which players receive and interpret feedback. While performance analysis is often discussed in terms of the tools and outputs involved, far less research has examined how players understand the information they receive, how much of it they recall, or how communication patterns shift depending on the competitive context. Given that the ultimate purpose of analysis is to support player learning and decision-making, this represents an important gap in the existing research.

1.1 Researcher Background

My background as an applied performance analyst in Gaelic Games influenced both the development of this study and the way in which it was approached. Working within similar coaching environments, I have experienced first-hand the practical challenges associated with delivering performance information effectively, managing communication among staff and players, and ensuring that analysis contributes meaningfully to preparation and performance. These experiences shaped the questions I considered important and provided a practical grounding for understanding the realities of analysis in context. In this sense, the study is informed by a pragmatic orientation, seeking to investigate issues that arise in real applied environments and aiming to generate findings that are useful for those working within them (Horner, 2016; Parsons, 2021).

As an insider researcher, I had familiarity with the rhythms, expectations, and communication patterns common within performance environments. This positionality offered advantages: it supported rapport with participants, allowed for shared professional language, and helped me recognise nuances in how coaches and players engage with performance information (Greene, 2014; May & Perry, 2022). Pragmatism acknowledges that such

experience is not a limitation but a resource, as knowledge is shaped through action and engagement with real-world problems (Goldkuhl, 2012; Kaushik et al., 2019). My practitioner background therefore contributed to a richer interpretation of the data and helped ensure that the research remained closely aligned with the applied settings it aimed to inform.

At the same time, balancing practitioner and researcher roles required ongoing reflection. Familiarity with participants may influence how openly individuals respond or how I interpret their comments (Holmes, 2020; Purdy, 2014). Recognising this, I adopted a reflexive stance throughout the research process and relied on supervisory oversight to challenge assumptions and maintain analytical rigour. Pragmatism does not seek objectivity in a traditional sense, but it does require transparency, reflexive awareness, and a focus on producing credible and practically meaningful insights.

Altogether, this positionality strengthened the study. It allowed the research questions to emerge from genuine applied challenges, ensured that interpretations were grounded in the realities of performance analysis practice, and helped position the findings as relevant to analysts, coaches, and players working in similar contexts.

1.2 Research Aims and Objectives

The overarching aim of this study is to examine how performance analysis information is communicated, understood, and retained within Gaelic Games environments. Although performance analysis is increasingly embedded in team preparation and review processes, relatively little is known about how players interact with the information they receive or how communication practices vary depending on context. This study therefore seeks to explore the frequency and formats through which players receive analysis based feedback, their perceptions of its usefulness, and the extent to which they recall key performance messages following matches. In order to give a comprehensive overview of the impact PA has in GAA environments we examined its application in both a developmental and performance focused context in the GAA. A developmental squad were assed for their engagement in the PA process across the course of their championship campaign while the DCU Fitzgibbon Cup & Sigerson Cup teams were assessed across both of their campaigns as they would place a much stronger emphasis on performance rather than development. This allowed us to examine the potential differences across code and setting in a GAA context. A further intention is to determine whether recall and communication patterns differ between winning and losing games, and whether there are notable distinctions between hurling and Gaelic football environments. Finally, the study aims to consider how performance information flows between analysts, coaches, and athletes within the broader coaching cycle, thereby offering a more complete understanding of how analysis supports learning and decision-making in applied settings.

Aim

To explore how performance analysis information is communicated to and understood by players within Gaelic Games environments, with specific attention to frequency, format, perceived usefulness, and recall.

Objectives

- To identify how players engage in performance analysis feedback and the formats through which it is delivered (e.g., video clips, team meetings, written reports, informal conversations).
- To examine players' perceptions of the usefulness, clarity, and relevance of performance analysis information within their team environment.
- To investigate how well players recall key performance messages following matches, and whether recall differs across types of information.
- To compare communication patterns and recall accuracy following wins versus losses, considering the potential influence of match outcome on emotional readiness and feedback engagement.
- To explore differences between hurling and Gaelic football in terms of analysis delivery, player perceptions, and recall.

Chapter 2: Literature Review

2.1 Introduction:

Performance analysis (PA) has undergone significant development over the past several decades, progressing from simple manual notation systems such as when sports enthusiasts began systematically recording game events. For example, match statistics for tennis appeared in newspapers as early as 1883, and by 1910 baseball writers like Fullerton were using notation systems (albeit unpublished) to log game actions. Early PA practice was largely descriptive, relying on hand notation to record key on-ball actions or critical game events (Eaves, 2015; ~~M. D.~~ Hughes & Bartlett, 2002). These early systems were labour-intensive and limited in scope, yet they provided the first attempts to capture performance in a structured, objective way (Eaves, 2015). As PA began to formalise in the 1970s and 1980s, notational systems became more systematic, enabling analysts to chart patterns of play, possession profiles, and technical contributions with greater reliability (Hughes & Franks, 2004).

The introduction of video technology marked a major shift in how performance was reviewed and understood. The advent of digital video and analysis software in the 1990s and 2000s rapidly expanded analysts' capabilities, enabling detailed event logging and replay from multiple angles (Hughes et al., 2008) . Instead of relying solely on written descriptions or memory-based accounts, coaches and analysts could now revisit match footage repeatedly, identify patterns previously unnoticed, and create visual reference points that supported clearer communication with players (Carling et al., 2005). Research confirms that objective, visual feedback can have a more profound impact on learning than subjective memory alone (Hughes et al., 2008). As video equipment became more affordable and portable, its use expanded rapidly across a broad range of sports, including Gaelic Games. By the early 2000s, video review had become a routine part of team preparation and post-match analysis, enhancing both coach education and athlete learning (Carling et al., 2005).

The next phase of PA development emerged alongside advances in digital software, allowing analysts to code events in real time, generate detailed breakdowns of technical and tactical actions, and produce more sophisticated performance indicators. The growth of platforms such as SportsCode and Dartfish supported a shift from generalised match review to more targeted, position-specific and phase-of-play analysis. This was accompanied by the integration of GPS and other athlete-tracking systems, which expanded PA beyond purely technical-tactical domains into physical and movement-based profiling (Wright et al., 2013). By combining video, coding, and athlete-tracking data, analysts were now able to provide a more holistic picture of player and team performance. This development in software has enabled precision and clarity in analysis at levels once unimaginable. Analysts can generate post-match

reports that include intricate details and high-definition video clips, all synchronised and coded. Such breadth of data has expanded the analyst's role, now requiring them to be data interpreters and communicators (O' Donoghue, 2007).

However, while technological developments greatly increased the volume and variety of available data, they also highlighted new challenges. Not all information produced by PA systems is meaningful, and players often struggle to interpret or retain large amounts of detail without appropriate guidance. The evolving nature of PA practice therefore prompted a shift from purely technical data-gathering roles toward more applied, relational, and pedagogical forms of practice. Analysts increasingly contribute to coaching decisions, support learning processes, and help shape the shared understanding within teams (Huggan et al., 2015; Mackenzie & Cushion, 2013). This applied turn places a strong emphasis on communication, clarity, and relevance, recognising that the value of analysis lies in its uptake by coaches and players rather than in the sophistication of the technology itself. Having technical skill in utilising the relevant software is necessary but not sufficient, with modern analysts attempting to distil complex datasets into clear messages for coaches and athletes. In other words, modern PA demands both analytical acumen and sufficient communication skills in which to translate their analysis to coaches and players alike (O'Donoghue, 2007).

This shift is reflected clearly in the framework proposed by Martin et al. (2021), who conceptualise PA as a sequence of interconnected practices that extend from data collection to communication and learning. Today, PA extends far beyond tallying statistics, it involves contextual and tactical interpretation. In team invasion sports (e.g. football, rugby, Gaelic games), performance analysts now dissect not only what happened (key performance indicators or KPIs) but why it happened, by examining patterns of play, spatial constraints, and opposition behaviours (Lord et al., 2020). Their applied model emphasises that analysis is not simply the production of numbers or coded actions, but an ongoing process involving interpretation, dialogue, and collaborative sense-making among analysts, coaches, and players. According to this perspective, the success of PA hinges on whether insights are communicated in ways that players can understand and act upon (Martin et al., 2021). In this sense, PA is increasingly recognised not just as a technical discipline but as an educational and relational one.

Despite this evolution, the communication element of PA, specifically how players receive, process, and recall information, has remained under researched, particularly in developmental environments. While much attention has been given to the tools and technologies used to gather data, far less work has explored how analysis is translated into player understanding, how it fits within their existing knowledge structures, or how well key messages are retained after matches. This gap is especially relevant within Gaelic Games,

where PA is now widely adopted but where the structures, resources, and player experience levels differ significantly from professional sports.

The purpose of this review is therefore to establish the foundations for understanding how PA information is communicated and learned within performance focused Gaelic Football and Hurling teams. Drawing on the applied process outlined by Martin et al. (2021), the review examines the evidence underpinning each stage of the PA workflow, from the creation and interpretation of performance information through to its delivery and subsequent retention by players. Through this lens, the review positions communication and understanding, as opposed to technology, as central to effective PA practice.

2.2 PA as part of the Coaching Cycle

PA has become a vital component in modern sport due to its influence on athlete development, coaching practices, and team strategy (Francis et al., 2024). One of the most significant advantages of PA is that it offers an evidence-informed framework to support and enhance the decision-making process for both coaches and athletes. Rather than relying on subjective interpretation or memory recall, PA technologies allow for a more precise and detailed understanding of performance. This allows coaches to tailor their training methodologies based on measurable performance data, enhancing the validity of feedback and ensuring that interventions are grounded in evidence rather than perception or instinct (Barker Ruchti et al., 2021).

Advances in PA technology have significantly improved the ability of coaches and athletes to assess and reflect on performance. Tools such as video analysis, GPS tracking, and motion capture now facilitate detailed and timely feedback (Young et al., 2020). These developments have transformed both individual assessment and team strategy, enabling real time adaptations that provide a competitive edge. In elite sport, where marginal gains often determine outcomes, PA provides access to immediate, accurate, and context-specific data that supports tactical decision-making as well as physical and psychological preparation (Brümmer, 2019).

The effectiveness of PA hinges on how well its outputs are interpreted and communicated (Robertson, 2020). Traditionally, feedback relied on coaches' memory or handwritten notes, both constrained by human perception and bias (Wright et al., 2013). Contemporary PA systems allow data to be captured, revisited, and analysed repeatedly, promoting more accurate and specific feedback. This shift towards evidence-based practice enables targeted development, helping athletes to clearly identify strengths, weaknesses, and specific areas for improvement (Jones et al., 2020).

The ability to engage in technology to show athletes the key areas in which they need to improve shows how PA can be critically important in its role in the development of young athletes. In elite academy settings, PA is seen as an essential component of long-term athlete development programs (Barlow et al., 2024). PA must be deeply embedded within the coaching philosophy in these environments to ensure that players are not only trained to perform but also educated in how to analyse and reflect on their performances (Morley et al., 2014). PA is used to support a holistic developmental process that includes technical skill refinement, tactical understanding, and psychological readiness. By being exposed to PA from a young age, athletes become accustomed to reviewing video footage, interpreting data, and using that information to drive personal improvement (Reeves & Roberts, 2013).

This developmental application is particularly important because it prepares youth players for the demands of senior-level competition. When PA is fully integrated into the coaching and training structure, it allows for a more systematic and reflective approach to learning (Martin et al., 2017). Athletes learn to take ownership of their development, as they can see their progress visually and statistically over time. this visual element is especially impactful for modern athletes, who often prefer feedback that is interactive and immediately actionable (Jones et al., 2020).

PA also fosters collaboration among coaches, players, and analysts by creating a shared language based on objective data. This common ground enhances communication clarity, supports joint problem solving, and cultivates a culture of continuous improvement. When players are presented with transparent and factual performance information, they are more likely to engage with the process and take accountability for their development (Wright et al., 2016). This dynamic is particularly important in elite settings, where small margins and constant scrutiny demand high levels of performance consistency (Barker-Ruchti et al., 2021). In high-pressure competition, the strategic application of PA enables teams to adapt rapidly based on real-time data rather than intuition. For instance, in game video analysis or live GPS feedback allows for immediate adjustments to formations or tactics. This adaptability is critical in sports where momentum can shift quickly. By replacing guesswork with reliable analysis, PA strengthens tactical decision-making and elevates overall team performance (Brümmer, 2019). This enthusiasm should be tempered, however, as critical reviews of the field have noted that much of the PA literature remains descriptive in nature and that there is limited empirical evidence directly linking the use of PA to improved performance outcomes (Mackenzie & Cushion, 2013). This highlights the need for applied research, such as the present thesis, which examines how PA is actually used and understood within the coaching process.

Key performance indicators (KPIs) lie at the core of PA in sport (Morgulev & Lebed,

2024). They serve as crucial measures that allow coaches and analysts to evaluate, plan, and enhance performance at both team and player levels. KPIs are defined as variables directly associated with success, enabling the transformation of complex performance data into clear and actionable insights (Lord et al., 2020). These variables should define some or all aspects of a performance through comparing the key actions of a game and help evaluate the performance of a team or athlete (Hughes & Bartlett, 2001). In the sport of Hurling, puckouts and shooting have been established as key performance metrics (Clear et al., 2017; Falconer et al., 2025; O'Brien et al., 2021). It should be acknowledged, however, that not all of the metrics used within this thesis have been validated as statistically significant predictors of match outcome, particularly in youth hurling. They are best understood as practitioner-defined variables, agreed collaboratively between the coach and the analyst to reflect the tactical priorities of each team, rather than empirically established indicators of success. They help bridge the gap between raw data and tactical decision making, with the ultimate aim of improving outcomes in competition (Lord et al., 2020). Early approaches to PA often relied on basic event counts such as goals scored, tackles made, or passes completed. While useful, these outcome focused metrics did not account for the dynamic and contextual nature of games (Eaves, 2015). Modern practice requires indicators to be embedded within tactical frameworks. Performance measures are most valuable when aligned with team objectives rather than used as isolated statistics (Hughes & Bartlett, 2001). For instance, possession percentage only becomes meaningful when it reflects a deliberate game plan that prioritises control and structured build up (Herold et al., 2021; Watson et al., 2017). This evolution reflects the growing recognition that success is not about accumulating favourable statistics, but about achieving them in a manner consistent with tactical identity (Morgulev & Lebed, 2024).

When analysing game styles KPIs play an expanded role. As team strategies vary significantly across sports and even among opponents within the same sport, identifying KPIs relevant to each team's unique style becomes critical (Morgulev & Lebed, 2024). The evaluation of game styles using appropriate KPIs enables analysts to understand whether the game plan was successfully implemented (Lord et al., 2020). Another dimension to KPI analysis is its increasing dynamism. Rather than relying solely on static, isolated game events, analysts are now encouraged to assess actions in context. This involves evaluating not just what happened, but how and why it happened. By doing so, analysts gain a deeper understanding of the interactions between team behaviours, opponent responses, and evolving game conditions (Herold, et al., 2021). Dynamic game actions are crucial to helping the analyst in creating the most accurate representation of the team's performance. This dynamic perspective is particularly relevant in team invasion sports, where spatial positioning, player interactions, and tactical adaptations continuously shift throughout a game (Herold et al., 2021). The growing

complexity of modern sport necessitates more sophisticated KPIs. PA needs to consider systemic elements of team sports like how players interact within a unit, how space is used, and how teams adapt to opponents. This systemic view aligns well with the concept of contextualized KPIs (Watson et al., 2017). In essence, a pass completion rate in isolation tells us little. However, when considered alongside defensive pressure, player fatigue, and field position, it becomes far more meaningful. Such contextualised analysis is made possible by technological advancements that allow for detailed tracking of player movements, physiological loads, and tactical behaviours (Lames & McGarry, 2007).

The increased availability of performance data brings its own challenges. Analysts must be aware of the over-reliance on data-driven decision-making without the necessary interpretation and contextual framing. The role of the performance analyst has consequently expanded from data collector to data interpreter and they are tasked with making complex, multilayered data understandable and practically useful (O' Donoghue, 2007). This makes the selection and communication of KPIs even more important, as analysts must choose which variables to prioritise based on tactical relevance and ensure that they are presented in a format that supports effective decision-making by coaches and players (Watson et al., 2017). KPIs are not universal; they must be tailored to the level of play, the sport, and even the individual player's role within a team (Lord et al., 2020). Position-specific KPIs allow for a more accurate assessment of individual contributions. In hurling, the same principle applies, with a goalkeeper assessed on puckout retention while a forward may be assessed on shot efficiency, and this is reflected in the KPIs agreed between the coaches and analysts across the two studies in this thesis. This specificity is essential for individual player development and for designing training sessions that target identified areas of weakness or strength (Sarmento et al., 2015). In practical terms, KPIs can be tailored to specific performance objectives. In hurling, shot efficiency and total shot count have been identified significant KPIs, strongly correlating with match outcomes (O'Brien et al., 2021). Research demonstrated that achieving a shot efficiency of 57% from play was typically sufficient to win games. Such granular benchmarking provides teams with tangible performance targets, enabling them to classify possessions that end in shots as "successful" and to refine their tactical approaches accordingly (Clear et al., 2017). An examination of shooting patterns in intercounty Gaelic games, concluding that winning teams consistently generated more shot attempts (especially from play) and converted their free-taking opportunities at significantly higher rates than losing sides. These findings highlight the value of indicators not only as evaluative measures but also as practical benchmarks for success (O'Brien et al., 2021).

One of the first steps toward building on the coach-analyst relationship and the impact that it has upon the coaching process is to develop a productive relationship between the analyst

and the player by providing contextual transparency (Nelson et al., 2023). When players do not fully understand what is being recorded or how their data is used, it can damage trust and create resistance toward the entire PA process. This problem can be particularly pronounced when new technologies or methodologies are introduced without appropriate explanation (Francis & Jones, 2014). Analysts must take responsibility for educating athletes about the purpose behind the data collection, how it informs coaching decisions, and how it can benefit the player's development. This process of clarity within analysis transforms it from a surveillance tool into a collaborative developmental tool which aids the player in their performance(Araujo et al., 2013). Players who understand the why behind performance feedback are more likely to engage constructively with the data and participate actively in debriefs and individual review sessions. Trust in the process enhances trust in the analyst (Barker-Ruchti et al., 2021). Analysts must be trained communicators capable of facilitating learning across various modalities (Wright et al., 2013) Whether through small-group video sessions, one-on-one reviews, or integrated feedback loops with coaching staff, analysts need to understand the pedagogical principles that underpin effective learning (Travis & Butterworth, 2024).

In summary, PA is essential in contemporary sport due to its ability to enhance performance through objective feedback, strategic analysis, and developmental support. The integration of PA tools into coaching practices has transformed how coaches work, how players learn, and how teams operate, and how performance is evaluated.. By replacing guesswork with data informed insights, PA strengthens the overall performance ecosystem and equips athletes with the knowledge and tools necessary to succeed at the highest levels.

2.3 Communication in the Performance Environment

Before examining this literature it is important to acknowledge that the majority of the research on PA communication has been generated within elite, adult, professional sport environments (Bateman & Jones, 2019; Martin, 2022; Nicholls et al., 2019). Care must therefore be taken when applying these findings to the developmental and university-level environments examined in this thesis. Evidence from developmental settings suggests that the principles of effective PA communication do not always transfer directly, as younger athletes differ in their cognitive readiness, their prior exposure to PA, and their relationships with coaching staff (Reeves & Roberts, 2013; Middlemas & Harwood, 2018). Throughout this section, the context in which each study was conducted is therefore highlighted at each transition between elite and developmental discussion, so that the reader can judge the extent to which the findings apply to the populations under consideration in this thesis, and it is noted where the evidence base for developmental settings remains thinner than that for elite sport.

Building on the previous section, which outlined how PA enhances training

environments and strategic planning, it is clear that the true value of PA lies not only in data collection but in how that data is communicated (Reeves & Roberts, 2013). Communication is the mechanism through which insights can become action, and it plays a central role in facilitating learning, supporting performance, and strengthening professional relationships within sporting environments (Calpe et al., 2013). Communication plays a foundational role in determining the effectiveness of PA within elite sporting environments. While data collected by analysts is critical for understanding performance, the real value of PA lies in how this information is communicated to coaches, players, and the wider performance staff (Martin, 2022). Without communication that is clear, purposeful, and sensitive to the sporting context, even the most sophisticated technological systems and detailed datasets risk being underused or, worse, misinterpreted. Communication is therefore not a peripheral concern in the PA process; rather, it is central to ensuring that analysis informs decision-making and leads to meaningful performance enhancement (Martin, 2022).

Coach feedback plays an essential role in facilitating athlete learning and enhancing performance. Feedback in sport can be categorised by its "what," "when," and "how" dimensions (Corbett et al., 2024). The "what" refers to whether feedback focuses on the outcome (knowledge of results) or the process (knowledge of performance), and whether it is descriptive (what happened) or prescriptive (what should happen). The "when" aspect addresses whether feedback is given during the activity (concurrent) or after it has occurred (terminal), and whether terminal feedback is immediate or delayed. Finally, the "how" dimension considers the mode of delivery; verbal, visual, or written (Corbett et al., 2024). Despite this classification, inconsistencies in the literature make it difficult to standardise best practices. Coaches frequently depend on experience and intuition, which underscores the need for clearer frameworks and definitions (Smith & Cushion, 2006).

In high-performance contexts, communication styles often shift depending on competitive demands. While autonomy-supportive approaches are encouraged for learning, directive styles are more common under pressure (Calpe et al., 2013). Emotional framing also affects the reception of feedback. For example, reinforcement during winning periods can sustain confidence, whereas negative feedback during losses must be carefully managed to avoid demoralisation (Corbett et al., 2024).

Debriefing has become a key communication strategy in elite sport (Kojman et al., 2022; Middlemas & Harwood, 2018). Whether immediately post-match or after a delay, debriefs offer structured opportunities for reflection, learning and cohesion. However, their emotional context matters. Following emotionally intense matches, debriefs require high emotional intelligence and strategic timing to maintain engagement (Wright et al., 2016). The timing and

tone of post-game communication must be carefully managed to maintain player motivation and engagement. Effective debriefs involve clear and structured communication that is sensitive to individual athlete preferences. Analysts must structure debrief sessions strategically, ensuring clarity, consistency, and alignment with the team's performance goals (Kojman et al., 2022). It should be noted that much of this debriefing research has been conducted with adult professional athletes, and work with youth players suggests that the psychological climate of the debrief, including perceptions of trust and the fear of being singled out in front of peers, strongly shapes how younger athletes engage with these sessions (Middlemas & Harwood, 2018).

A growing body of research supports the idea of shared decision-making and autonomy supportive communication in sport).(Reeves & Roberts, 2013; Berntsen & Kristiansen, 2019; Mossman et al., 2024). More recent work grounded in self-determination theory reinforces this position, with autonomy supportive coach communication shown to enhance athlete motivation and engagement across both adult and youth settings (Mossman et al., 2024). Players who understand and contribute to the PA process are more likely to internalise feedback and take ownership of their development (Mills et al., 2014). This is particularly important for elite athletes, who often demand individualised feedback and expect their input to be valued in the analysis process (Reeves & Roberts, 2013). A player-centred approach to communication fosters trust, encourages engagement, and ultimately enhances performance (Morley et al., 2014). Communication quality can determine whether PA interventions succeed or fail. Sessions that are clear, concise, and constructive support understanding and motivation, while poor communication can lead to confusion or disengagement. This makes communication one of the most important skills for performance analysts. Analysts must translate complex data into accessible and impactful insights. Regardless of analytical accuracy, poor delivery can undermine effectiveness (Martin, 2022). As such, it is no longer adequate for an analyst to be skilled solely in technology or data interpretation; they must also be able to clearly and persuasively communicate their insights to coaches and athletes in ways that promote understanding and action.

The performance analyst's role has expanded significantly in recent years due to technological advancement, alongside the increasing volume of data available in elite sports (Francis et al., 2024). While much of the data collected in PA is outcome focused, meaningful performance enhancement requires a deeper understanding of the processes leading to those outcomes (Painczyk et al, 2017). Analysts must work in alignment with coaching strategies and player needs, reinforcing their role as both service providers and collaborators (Lord et al., 2020). Effective communication also fosters alignment across the coaching team. When analysts, head coaches, and assistants share a common understanding of KPIs and priorities,

the team's strategic approach can become more coherent. This consistency not only enhances tactical execution during competition but also improves the quality and efficiency of training sessions, where objectives are clearly communicated and reinforced across staff roles (Barker-Ruchti, 2021). Communication is not just about the frequency or clarity of messages, it is also about alignment. Analysts must understand how the coach defines success, what tactical elements are prioritised, and how players are expected to behave in certain scenarios. This shared understanding helps ensure that the data being collected is relevant and that the insights provided can inform immediate coaching decisions or longer-term developmental strategies (Mackenzie & Cushion, 2013). For PA to truly support long-term athlete development, communication strategies must be tailored to the athlete's stage of development, cognitive profile, and emotional readiness (Partington et al., 2014). Younger or less experienced athletes may require supportive, non-confrontational feedback, while more seasoned performers may prefer concise, direct, data-driven messages. Analysts must therefore be skilled in adjusting tone, content, and delivery method to meet individual needs. Feedback that is productive for one athlete may be ineffective, or even harmful, for another. A rigid, one-size-fits-all approach is unlikely to succeed in diverse team environments (Reeves & Roberts, 2013). The ability to personalise communication in PA is not simply a matter of style, but a strategic competence that underpins athlete engagement and learning.

Communication also underpins the coach-analyst relationship. Strong professional trust and respect lead to greater implementation of analytical insights. Coaches often prefer analysts they have worked with before, highlighting the importance of communication consistency in fostering lasting collaboration (Bampouras et al., 2012; Bateman & Jones, 2019). Trust is a central theme in the literature on PA communication. Analysts function as service providers embedded within performance ecosystems, where their influence depends not only on technical proficiency but also on the strength of their relationships. Trust is not incidental, it is the product of consistent, honest, and tactfully delivered communication. Analysts must present information in ways that align with the team's performance goals, support the coach's philosophy, and suit the learning needs of players (Martin, 2022). Coaches often act as 'gatekeepers', filtering the analyst's insights before they reach the players. As a result, the analyst's ability to communicate in a manner that the coach finds actionable directly influences whether the analysis affects practice and game plans (Bampouras et al., 2012). For this reason the relationship between the coach and the analyst is particularly sensitive to communication dynamics. A productive coach-analyst relationship is built upon mutual respect, transparency, and frequent, meaningful communication (Bateman & Jones, 2019). When trust is established, the analyst transitions from a peripheral technician to a central contributor within the coaching team, influencing planning, execution, and review processes (Barker-Ruchti, 2021).

In developmental settings such as academies or youth programmes, the importance of communication is even more pronounced. Young athletes are not just learning how to play, they are learning how to learn. Here, the analyst's role extends into education, with PA becoming a teaching tool as much as a performance tool. Developmental communication must also be age appropriate in line with their epistemological age (Noroozi & Hatami, 2019; Schommer, 1998). The "epistemological age" of a player that is, their maturity and readiness for complex thinking, affects how they receive and respond to feedback. Analysts must tailor both the content and the format of communication to the cognitive and emotional stage of the athlete (Reeves & Roberts, 2013). This is not just the case in developmental setting, in all sporting settings, the emotional environment of debrief sessions plays a more critical role in engagement than their length (Nicholls et al., 2019). Players are more likely to embrace feedback when they perceive the setting as a psychologically safe space. Here; communication style, empathy, tone, framing, and timing, matters just as much as the content being delivered (Nicholls et al., 2019). Debrief sessions represent a key setting in which communication determines the success of PA. Debriefing can serve multiple purposes: correcting mistakes, reinforcing strengths, building cohesion, and setting goals for future performance. However, these outcomes depend on the delivery style of the feedback (Kojman et al., 2022). There is a challenge previous to assumptions about session length—arguing that the duration of a debrief matters less than the psychological safety of the environment. If players feel secure and respected, they are far more likely to engage with feedback, regardless of the length of the session. This reinforces the need for analysts to build relationships grounded in trust, empathy, and open communication (Kojman et al., 2022).

Modern PA tools such as telestration have transformed how insights are presented. Research indicates that athletes who grew up in technology saturated environments engage better with visual, concise, and interactive forms of communication (Barlow et al., 2024). Athletes can be more receptive to feedback when it is customized to their needs, both in content and format of delivery. Thus, analysts must build rapport and trust with players to encourage active engagement and ensure feedback is internalised rather than dismissed (Jones et al., 2020). For some, the value of PA may not be immediately apparent, particularly if the feedback is overly technical or abstract. If players do not understand what is being recorded or how it will be used, their engagement with the process may decline (Barker-Ruchti et al., 2021). Consequently, without understanding what is being measured or why it matters, players may not engage meaningfully with analysis. Miscommunication, or the absence of communication altogether, can erode trust and lead to scepticism or even resistance to PA interventions (Barker Ruchti et al., 2021). Ensuring clarity, accessibility, and relevance in communication with athletes is therefore essential to sustaining their involvement and benefitting from PA insights.

Analysts must communicate in ways that empower athletes to become self-analysts. This involves not only presenting data but also explaining how and why that data matters. When done effectively, this fosters a feedback-rich culture in which athletes reflect on their own performance and take ownership of their development trajectory (Brümmer, 2019).

A critical distinction in sport communication is between training and competition contexts. In training, there is often more time and freedom to explore detailed feedback, experiment with tactics, and correct errors. Conversely, in competition, time constraints and heightened emotional stakes demand succinct, high impact communication that supports immediate decision-making (Morgulev & Lebed, 2024). During competition communication must be rapid, precise, and often delivered through intermediaries such as assistant coaches. The high-pressure environment limits the analyst's direct engagement with players, placing an even greater premium on the communication that takes place in a training environment to ensure clarity. In this sense, the groundwork laid during training determines the effectiveness of in-competition adjustments (Guzmán & Calpe-Gómez, 2012). Analysts must therefore adapt their communication methods accordingly, using real-time data monitoring to inform tactical changes and provide concise feedback that can be quickly interpreted and applied by coaches and players (Morgulev & Lebed, 2024). While verbal communication is the most commonly used mode during live gameplay, analysts may also disseminate their insights via hand signals, visual aids, or coded messages relayed through coaching staff (Bateman & Jones, 2019). This flexibility is necessary to maintain efficient communication under the pressure and unpredictability of live sporting events (McLean et al., 2017). Beyond formal PA sessions, communication between players on the field is crucial. It enables them to adapt, coordinate, and respond collectively to game situations. Communication enhances situational awareness and facilitates rapid decision-making, which is particularly important in team invasion sports where match contexts are continuously evolving (Ford et al., 2010). Feedback in competition settings also leans toward actionable instruction, favouring prescriptive over descriptive communication. Coaches and analysts must work together to distil key messages into simple cues that players can implement immediately. This requires not only technical clarity but also a shared vocabulary between analysts, coaches, and players; a common language of performance that must be developed collaboratively over time (Smith & Cushion, 2006).

Despite its importance, communication in sport is fraught with challenges. These include inconsistent terminology in feedback research, time constraints during competition, varying communication preferences among players, and differences in psychological readiness (Mulvenna et al., 2024; Nelson et al., 2023; Nicholls et al., 2019). Moreover, not all coaches or analysts are trained communicators, and even those who are may struggle to balance brevity with depth under pressure (Martin, 2022). There is also a risk that the increasing reliance on

data can over objectify the feedback process. If communication becomes too technical or abstract, it may alienate players rather than support them. Thus, effective communication must strike a balance between data precision and human connection (Travis & Butterworth, 2024).

Effective team communication fosters psychological safety, cohesion, and trust among teammates, key factors in achieving high level performance and tactical execution. Conversely, breakdowns in communication can lead to errors, disorganisation, and missed opportunities. Coaches and analysts can support team communication by developing shared mental models (SMM's) and reinforcing communication cues during training (Calpe et al., 2013). SMMs is a theory that promotes team good teamwork and team effectiveness, that helps to explain why high performance teams can often coordinate their performance without explicit communication (Espevik et al., 2011). As PA becomes more integral to sport, the analyst's ability to build meaningful dialogue becomes a defining factor in their impact Martin et al., 2017).

The communicative demands of PA are inherently complex, cutting across multiple disciplines including data visualisation, psychology, pedagogy, and leadership. Performance analysts must go beyond technical expertise in software and statistical modelling to also understand the subtleties of human behaviour, group dynamics, and effective learning strategies. Their role requires them to navigate interpersonal relationships, organisational structures, and at times, the politics of high-performance environments. Analysts must manage communication in all directions, upwards to senior coaches, laterally to fellow support staff, and downwards to players, all the while adapting their messages to the knowledge, preferences, and expectations of each audience (Martin, 2022). This versatility is increasingly recognised as a defining feature of effective PA professionals.

Overall, the literature supports the view that the effectiveness of PA is fundamentally linked to the quality of communication between analysts, coaches, and athletes with communication having a varied and established role within this process. As PA becomes more embedded in elite sport, the emphasis must shift beyond data generation to the art and science of translating that data into meaningful action. Understanding how to do this effectively, within the emotional, cultural, and pedagogical context of a team, is essential for analysts seeking to maximise their impact on performance. There is heavy emphasis placed on the importance of the environment in which the PA is being conducted, as to how the information is communicated both to the players and the coaching staff.

2.4 The Role of the Analyst in the PA Process

The coach–analyst relationship is one of the most pivotal dynamics in modern sport performance environments (Mulvenna et al., 2024). As previously mentioned, the rise of PA as

a cornerstone of elite sport, the interaction between coach and analyst has evolved from a peripheral connection to a deeply integrated partnership that influences decision-making, player feedback, training planning, and tactical adjustments (Wright et al., 2013). The effectiveness of this relationship is now seen as a determining factor in the successful implementation of PA. At the heart of this dynamic is the recognition that analysts are not merely data collectors, but interpreters and communicators of performance insights. Their ability to produce and contextualise data places them in a position of influence over the coach's strategies and decisions (Bateman & Jones, 2019). However, this influence is contingent on a shared understanding between the analyst and the coach, beginning with alignment in coaching philosophy and mutual trust. Without such understanding, even the most insightful data can be misinterpreted or ignored, leading to suboptimal application of analysis (Barker-Ruchti et al., 2021). The emotional, cognitive, and behavioural elements underpin the development and sustainability of this relationship. Coaches often seek analysts with whom they have previously worked, highlighting the interpersonal rapport and reliability as key qualities. Analysts report that being "hardworking, honest, and approachable" are traits that enable a productive relationship with coaches. Analysts who can understand the personal and professional expectations of the coach are better positioned to deliver analysis that resonates (Bateman & Jones, 2019).

Despite the clear importance of the coach–analyst relationship, there remain barriers to its full potential. Misaligned philosophies, lack of communication, poor understanding of data literacy, and rigid hierarchies can all undermine the collaborative process. Coaches may resist PA if they feel threatened by it, and analysts may struggle to establish influence if they lack the interpersonal skills or credibility within the team structure (Barker-Ruchti et al., 2021; Wright et al., 2013). Analysts must manage how feedback is framed. They need to decide whether it should be descriptive, prescriptive, immediate, or delayed, and then adapt their presentation style to suit both the competitive context and the coach's informational needs. Miscommunication or mismatched expectations can strain the relationship and ultimately hinder the team's performance (Travis & Butterworth, 2024).

The feedback loop between analyst and coach is integral to performance enhancement. Analysts provide objective data and contextual insights, which coaches interpret and apply in designing sessions or making tactical decisions (Gómez-Ruano, 2018). Ideally, this loop is dynamic and responsive: the coach outlines what they are looking to learn; the analyst captures relevant data; both parties discuss findings and determine how to implement changes. However, this process is only effective if both parties are open to feedback themselves. Analysts must be receptive to coaches' critiques or suggestions on the type and format of analysis, while coaches must be willing to reflect on their own practices in light of the data presented to them

(Mulvenna et al., 2024). Relationship-building and communication are the two most vital skills for the role. Trust and rapport built through regular, transparent communication enable the analyst to become a consistent presence in the performance cycle, from planning to debriefing (Martin, 2022).

Emphasis should be placed on the analyst's role in shaping a team's learning environment. Through thoughtful design of feedback sessions, contextual video presentations, and strategic reporting, analysts can influence how coaches learn, how players engage with their performance, and how teams develop over time (Mulvenna et al., 2024). One specific area where the coach–analyst relationship plays out is in the structuring and delivery of debrief sessions. The effectiveness of debriefs hinges on how the analyst and coach collaborate to plan and deliver them. Analysts are often responsible for compiling video footage, generating clips, and highlighting performance trends, while the coach decides how this information will be presented to the players and what the instructional emphasis will be (Kojman et al., 2022). Therefore, emotional intelligence on the part of the analyst becomes paramount. The ability to "read the room" as a key skill for performance analysts. The best analysts are those who can adjust their tone, timing, and content delivery based on the mood and mindset of the players they are working with. This kind of interpersonal awareness allows the analyst to frame feedback in a way that is constructive rather than confrontational, fostering a positive and productive working relationship (Martin et al., 2021). The increasing influence of analysts on decisions and player development, ethical considerations have begun to surface highlighting concerns over data usage and interpretation, particularly the risk of overemphasising statistics without understanding context. Analysts must guard against the temptation to let data drive decisions autonomously. Instead, they should use data to inform decisions, integrating it with coach insight and athlete experience (Sarmento et al., 2015). There are also concerns around data saturation and selective interpretation. In high-pressure environments where coaches demand quick answers, there is a risk of confirmation bias, where only data that supports pre existing beliefs is presented (Painczyk et al., 2017). The analyst must remain ethically grounded, ensuring that their interpretations are valid, balanced, and transparent (Painczyk et al., 2017).

Analysts work hand-in-hand with coaches to co-construct meaning from performance data (Mulvenna et al., 2021). Rather than handing over data in isolation, the analyst is actively involved in reflective conversations with coaches to help uncover hidden trends or challenge assumptions. This interactive model shifts the analyst from being an information provider to being a reflective practitioner and co-thinker. It also reinforces the need for strong interpersonal skills, as analysts must be able to question coaches diplomatically and engage them in mutual problem-solving (Wright et al., 2013).

The analyst's growing influence in shaping coaching decisions has also shifted the power dynamic within performance environments (Bateman & Jones, 2019). Analysts are often in a unique position — they are neither players nor traditional coaches but sit somewhere in between. Their insights may challenge long-held coaching beliefs or expose uncomfortable truths about team or individual performance. This can lead to tension unless the analyst has established a foundation of trust and collaboration. If the coach perceives the analyst's role as supportive and aligned with their objectives, the relationship thrives. If, however, the analyst is perceived as intrusive or misaligned, their contributions may be marginalized or resisted (Bampouras et al., 2012).

The coach acts as the "gatekeeper" of information. While the analyst compiles, interprets, and presents insights, it is the coach who decides what information is shared with players and how it is integrated into training or matchday strategy. Therefore, the analyst must build a relationship based on trust, dependency, and mutual respect to ensure that their insights are fully utilized. Analysts are becoming increasingly strategic in their role (Bampouras et al., 2012). No longer focused solely on post-game review, they are now involved in opponent scouting, in-game tactical shifts, and even player recruitment decisions. Their work informs broader organisational strategies and contributes to the culture of continuous improvement within high-performance environments. There is a growing demand for analysts to understand broader psychological and sociological dimensions of performance (Francis et al., 2024). They suggest that analysts who comprehend team dynamics, athlete motivation, and behavioural responses to feedback can better tailor their output to enhance learning and decision-making (Francis et al., 2024). With the growing complexity of elite sport and technological advances enabling deeper layers of data capture, the role of the analyst has expanded significantly. Analysts are now viewed as strategic partners in the coaching team. Analysts must align their KPIs and interpretations with the strategic goals of the coach. If the analyst understands the "why" behind a coaching decision, they can provide feedback that enhances rather than contradicts the intended direction of the team. This shared strategic framework ensures the PA is not only accurate but also actionable (Morgulev & Lebed, 2024). The analyst's work must align with the broader messaging of the coach; whether the emphasis is on tactical discipline, effort, technical detail, or team cohesion. Analysts must ensure that the debrief supports the coach's goals while also facilitating learning, accountability, and motivation for players. Analysts' mastery of presentation tools, such as telestration and interactive graphics, further enhances their impact on these sessions. Debriefs, when structured effectively, can enhance the coach–analyst relationship by serving as a demonstration of their synergy. A well-coordinated debrief is a testament to their shared understanding and reinforces the analyst's value to the coaching process (Jones et al., 2020).

Building rapport and establishing communication preferences early in the season can help to ensure that feedback sessions are productive and well-received. This process includes identifying whether the athlete prefers data, video, conversation, or a mixture—and whether they benefit more from verbal or visual inputs (Martin et al., 2024). Personalised and relevant feedback plays a central role in solidifying the player-analyst relationship, as elite players place significant value on analysts who can identify not just their weaknesses, but also highlight areas where they are excelling. When feedback sessions are used to demonstrate progression and validate hard work, players become more receptive to areas requiring improvement. This balance fosters psychological safety, increasing the likelihood that players will engage with constructive criticism rather than shutting down (Morley et al., 2014). This is a key factor in establishing a strong player-analyst dynamic through encouraging active participation in the PA process. Thus, players must be more than passive recipients of feedback; instead, they should be encouraged to engage in reflective learning, participate in discussions during review sessions, and even self-analyse where appropriate. This transition requires analysts to function not only as data interpreters but also as educators and facilitators of learning. This form of engagement deepens the athlete's understanding of their performance and instils a sense of agency in their development. However, facilitating such engagement is not without its challenges. For instance, younger or less experienced athletes may lack the psychological maturity or tactical literacy to fully benefit from complex data-driven feedback. In these cases, the analyst must tailor the presentation of information to suit the athlete's epistemology age (Reeves & Roberts, 2013). There is claims that PA should be adapted for the communication styles and feedback structures to meet players where they are developmentally. Analysts who fail to do this risk alienating athletes or overwhelming them with information that is too abstract or critical for their current level of understanding (Wright et al., 2016). Athletes may differ significantly in their openness to feedback based on experience, personality traits, or previous exposure to PA; the analyst must be attuned to individual differences in learning style, confidence, and psychological readiness (Nicholls et al., 2019). While some athletes may thrive on frequent, detailed data, others may find it overwhelming or demotivating. Younger players, in particular, may not have the confidence or cognitive maturity to process critical feedback constructively. The analyst must, therefore, adjust their messaging to suit each individual, perhaps offering affirmation before critique, or delivering insights privately rather than in a group setting (Nelson et al., 2023).

The player-analyst relationship is not solely based on tactical or technical feedback. Analysts also now play a significant role in physical load management through the use of wearable technology such as GPS trackers. These tools enable analysts to monitor player movement, intensity, fatigue, and recovery, providing data that can inform rest schedules,

injury prevention, and individualised training loads. This expansion of the analyst's role has important implications for their relationship with players. By helping to prevent injury and promote long-term physical well-being, analysts demonstrate a broader concern for the athlete beyond their in-game performance. This can enhance the trust and value players place in analysts, especially when the analyst's data leads to observable improvements in physical readiness or recovery outcomes (Muniz-Pardos et al., 2021). The analyst is no longer a passive observer of performance; they are now a performance partner, deeply embedded in the development and execution of the athlete's individual journey (Francis et al., 2024). Analysts serve both as technical support providers and as trusted collaborators in shaping the athlete's growth. This redefined relationship requires a broad skill set: technical proficiency with PA tools, pedagogical insight into athlete development, emotional intelligence for communication, and strategic alignment with coaching staff (Francis et al., 2024). Analysts who can bridge these domains provide value not only to the coaching team but also directly to the athletes themselves. The emphasis on collaborative analysis, in which analysts and players jointly explore data, highlight trends, and identify solutions, marks a significant shift in performance paradigms. Rather than delivering answers, analysts now facilitate conversations, asking questions that guide athletes toward deeper understanding and personal ownership of their performance (Francis et al., 2024).

2.5 How PA is used to support Player understanding

Before considering how PA feedback operates in sport specific settings, it is important to ground the concept of feedback in the wider educational and psychological literature. Hattie and Timperley (2007) describe feedback as information provided by an agent regarding aspects of a learner's performance or understanding, and argue that effective feedback must answer three questions for the learner; where am I going, how am I going, and where to next. Similarly, Nicol and Macfarlane-Dick (2006) highlight the role of feedback in developing self-regulated learners, noting that good feedback practice helps learners to monitor, evaluate and adjust their own performance over time. These frameworks are directly relevant to PA, as the video and data based feedback delivered by analysts is ultimately an educational intervention which aims to move players from an understanding of their current performance towards the actions required to improve it. Viewing PA feedback through this educational lens highlights that the design, timing and delivery of feedback matter as much as its content, and provides the theoretical grounding for the PA specific literature discussed below.

In developmental sport settings, particularly in youth developmental environments, PA has emerged as a crucial educational and developmental tool. It has evolved beyond its origins of outcome-based metrics and simple statistical tracking, becoming embedded within broader

pedagogical frameworks designed to shape players holistically. Across elite academies, coaches and analysts have increasingly aligned PA tools with long term development goals rather than short-term performance results (Reeves & Roberts, 2013). This recorded information becomes the basis for structured feedback that, when effectively delivered, facilitates effective learning (Brümmer, 2019). This shift is reflected in both the structure of youth development programs and the methodologies used to evaluate and support players' progression (Reeves & Roberts, 2013). Analysts in developmental settings contribute to the planning and delivery of team-based learning. They support this by compiling video clips of team play, identifying recurring patterns or tactical errors, and by presenting this information to groups of players, they help to cultivate collective understanding and cohesion. These presentations are usually short but require the analyst to spend considerable time preparing the content for presentation. When executed well, they serve as foundational elements for subsequent training sessions, reinforcing tactical themes that are then practiced on the pitch (Jones et al., 2020). PA also contributes to developing a player's tactical understanding and overall game intelligence. By working closely with analysts, coaches can expose players to key concepts such as spatial awareness, decision-making under pressure, and pattern recognition, all of which are critical components of high-level performance (Morley et al., 2014).

Elite youth football academies now often employ full-time analysts as an integral part of the coaching team. This investment signifies the recognition of PA as a foundational pillar in player development (Herold et al., 2021). The last two decades have seen a significant rise in the use of modern PA technologies within these environments, which support the coaching process by translating tactical and analytical knowledge into practical learning experiences. These tools enable the gradual development of players' understanding and execution of tactical systems through training sessions structured around recurring, progressive patterns (Gómez Ruano, 2018). Video footage for example, plays a central role in this process. It is used in two principal ways: firstly, to reinforce positive behaviours by highlighting instances where players correctly executed strategies developed during training, and secondly, to identify and deconstruct breakdowns in performance. As a result, young players not only acquire the technical skills needed for high performance, but also internalise strategic frameworks and decision-making protocols (Brümmer, 2019). Athletes value personalised feedback which places a greater onus on analysts to go beyond generic team-wide reviews and tailor feedback packages to the individual. Whether highlighting tactical awareness, technical execution, or physical performance, personalised feedback can resonate deeply and can result in behavioural charge (Francis & Jones, 2014).

From a developmental perspective, indicators are equally valuable. As outlined earlier in this chapter, in academy settings indicators can be used to monitor progression across a

season rather than to judge isolated performances. In this context they function not only as performance benchmarks but also as educational tools. For example, in youth football programmes, passing accuracy may be tracked across seasons in both training and matches to show players how their technical and tactical abilities are developing in line with training objectives. In training matches players made more passes with fewer mistakes compared with competitive matches so parameters can be put in place to simulate match situations & train players more adequately using KPI measurement (Herold et al., 2021). Analysis that uncovers the processes underpinning success is more beneficial for growth than simple outcome measures. A process oriented approach is therefore essential for nurturing emerging athletes (Lord et al., 2020).

The implementation of PA within English Premier League academies illustrates the effectiveness of this developmental model. In these situations PA is primarily used to support tactical adaptation, skill refinement, and team cohesion. Feedback sessions are centred around long term development themes highlighting that the analyst needs to tailor feedback not only to the situation but also to cater to the athletes developmental stage, psychological readiness and preferred learning style. Analysts must strike a balance between highlighting errors and reinforcing successful behaviours (Reeves & Roberts, 2013). This strategic use of PA helps to reinforce broader developmental goals and ensures alignment across coaching, training and match analysis. As players mature, their engagement with PA is expected to deepen however consideration must be given to their individual psychological readiness. Younger or less experienced players may not yet possess the emotional resilience needed to interpret dense tactical information or accept highly critical feedback. The analyst is required to carefully structure how information is presented, ensuring it is accessible, constructive and appropriate for each player's stage of development (Reeves & Roberts, 2013). While PA is often linked to physical performance and tactical decisions, its role in psychological development is also significant, as PA can influence the athlete's mental state depending on how the feedback is framed. A focus on strengths and constructive solutions can enhance confidence and motivation. Conversely, repeated exposure to negative clips or overly critical feedback can have detrimental effects. This underscores the need for emotional intelligence in analysts and coaches alike in delivery (Kojman et al., 2022).

A key advantage of PA in developmental settings is its capacity to tailor feedback according to a player's developmental stage. Research indicates that as players mature and improve technically, the nature of the feedback evolves. While early-stage players may benefit from regular, guided feedback, over time the frequency and directiveness of such input should decrease to promote problem-solving and decision-making skills. This gradual transition fosters not only independent thinking but also a deeper understanding of tactical contexts (Corbett et

al., 2024). In these developmental settings, player autonomy with regard to PA is strongly promoted through the use of self-analysis and reflective learning. This encouragement to engage the players with the video helps to develop their ability to independently evaluate their performance, which is key to producing intelligent, adaptable players capable of making informed decisions in dynamic game environments. Analysts may even upskill players in the basics of analysis software, empowering them to take ownership of their learning through engaging them in the Performance analysis process. Their engagement & involvement helps to equip them with the skills to navigate and use the analysis software to better support their learning (Reeves & Roberts, 2013). It is increasingly recognised that different athletes absorb information differently. Factors such as learning style, confidence levels, and even personality types play a role in how effectively feedback is received. The analyst, therefore, must be attuned not just to the data but to the athlete behind the data. This may mean changing the tone, format, or frequency of feedback depending on the recipient (Jones et al., 2020; Reeves & Roberts, 2013). The rise of technology has dramatically shaped how feedback is delivered and absorbed. Today's athletes, having grown up in a digitally saturated environment, have different cognitive and attention profiles. These athletes prefer interactive, concise, and visually engaging feedback formats (Giblin et al., 2016). Telestration tools are increasingly used to cater to these preferences. Such tools not only make content more digestible but also promote greater engagement, especially when time on the pitch needs to be minimized due to load management or scheduling demands. Telestration enhances learning by linking visual evidence to specific tactical objectives, offering players immediate clarity (Lord et al., 2020). It also allows for training sessions to be more targeted, as specific visual feedback can inform drill design and player positioning. In effect, the analyst becomes a translator, converting raw performance data into learning cues that the athlete can internalize and apply (Lord et al., 2020).

Live demonstrations or peer modelling have largely been replaced by video analysis as it not only demonstrates ideal execution but also provide tangible examples of poor decisions or breakdowns in tactical coherence (Jones et al., 2020). However PA serves not just to critique but to reinforce positive behaviours. Positive reinforcement through video review, such as highlighting good decision-making or effective execution, can be a powerful motivational tool that increase the likelihood of them being repeated in future matches. By celebrating correct execution as much as correcting errors, PA becomes a balanced feedback mechanism that supports both performance improvement and psychological growth (Brümmer, 2019).

One of the most critical components of PA as a learning tool is feedback; how it's given, when it's given, and the content it delivers. While feedback tied to punishment or praise may have a role in shaping behaviour, it holds limited value for long term learning. More impactful feedback is detailed, reinforces desired behaviours, and is delivered with precision (Corbett et

al., 2024b). This provision of balanced feedback allows for the establishment of trust and communication which underpins all aspects of PA in developmental settings. For the process to be effective, players must trust that the data they receive is accurate, constructive, and relevant. They must also feel comfortable asking questions and participating in feedback sessions. Analysts who are honest, approachable, and supportive are more likely to foster engagement and enhance the learning experience. This relationship is particularly critical in academy settings where players are still forming their identities as athletes and learners (Jones et al., 2020). The efficacy of PA in developmental settings also depends significantly on the structure and quality of feedback sessions, particularly debriefs. When executed effectively, debriefs can be critical in cultivating player and coach relationships, promoting self-awareness, and encouraging long-term development. The tone and delivery of these sessions must be carefully managed, with an emphasis on constructive criticism and psychological safety. This is especially important for younger or less confident athletes, who may be less able to process negative feedback effectively. Analysts are advised to focus debrief discussions on key performance priorities while minimizing overemphasis on mistakes, in order to protect players' motivation and confidence (Kojman et al., 2022). Within Gaelic games specifically, O'Brien and colleagues (2025) have outlined how feedback interventions can be scaffolded, with the level of analyst support structured at the outset and then gradually reduced as players develop the capacity to analyse and reflect on performance independently (O'Brien, C., et al., 2025). While these strategies were developed with senior players, not all of them may be directly applicable to the populations examined in this thesis, and the level of scaffolding required by an Under-15 development player is likely to be considerably greater than that required by an established university player. This critique reinforces the point made throughout this chapter that frameworks developed in adult elite settings require qualification before being applied to developmental contexts. Similarly, Middlemas and Harwood (2018) highlight the psychological factors that shape how young players experience video feedback, noting that perceptions of trust, psychological safety and the fear of being exposed in front of peers strongly influence engagement with debriefing sessions. These considerations reinforce the importance of tailoring both the structure and the tone of feedback to the developmental stage of the athlete.

The analyst-coach collaboration is another central component of PA in developmental environments. Analysts provide coaches with data-driven profiles of individual players, detailing both their strengths and areas requiring improvement. This profiling process allows coaches to make informed decisions about player development pathways and to identify those most suited to specific roles or positions. By building longitudinal data on each player, the analyst and coach can track developmental progress, tailor training accordingly, and plan individualised intervention strategies (Mackenzie & Cushion, 2013). As a result PA has

demonstrated value in managing training loads and monitoring player well-being. Technologies such as GPS trackers and other wearable sensors provide data on physical output, helping to prevent overtraining and reduce the risk of injury. This information, when interpreted effectively, enables coaches and analysts to make evidence-based adjustments to training plans, balancing the demands of skill acquisition with the need for physical recovery (Muniz-Pardos et al., 2021). A key aspect of PA as a learning tool is its capacity to provide context. Rather than relying on outcome-based statistics, effective PA seeks to understand the process behind actions; why a decision was made, how space was exploited or misused, and what tactical options were available at a given moment. Analysts can use dynamic game modelling to present scenarios that mirror game conditions, enhancing tactical learning. As athletes are exposed to these layers of contextual insight, they become better problem solvers and more tactically astute (Lord et al., 2020).

Debriefing sessions are a cornerstone of learning within a PA context. A well-executed debrief improves not only learning but also cohesion and psychological safety within the team. Earlier assumptions suggested that shorter sessions were more effective for maintaining engagement (Wright et al., 2014). However, recent perspectives emphasise that the atmosphere in which the session takes place is more important than its duration. Athletes are more likely to benefit when they perceive the session as a constructive and supportive environment (Kojman et al., 2022).

Analysts are no longer passive observers or data recorders. Their role has expanded to include educator, communicator, and sometimes even mentor. They structure debrief sessions, organise feedback materials, and ensure that learning objectives are clearly communicated to players. The analyst becomes an integral part of the coaching process, supporting not only the delivery of tactical knowledge but also the overall learning culture within a team (Mackenzie & Cushion, 2013). Analysts must build trust with both coaches and players. This relational component is vital. Only when trust is established will athletes feel comfortable engaging in critical feedback sessions and asking questions. In this way, analysts become enablers of comfortability, a prerequisite for effective learning (Martin, 2022).

2.6 Performance Analysis in Performance Sport

In performance sport, PA plays a central role in optimising both individual and team performance. The integration of PA tools and technologies into performance environments has been driven by the ever-increasing demand for marginal gains, defined as small but critical improvements that can provide a competitive edge (Sarmento et al., 2015). PA is no longer a peripheral activity; it is deeply embedded into the fabric of performance sports organisations, shaping preparation, in game decisions, and post-match evaluations with the

feedback provided by the performance analyst shaping future direction of coaching & training which is a change from traditional coaching norms (Wright et al., 2012).

PA in performance sport is used to support tactical planning and strategic decision making. One of the most widely used tools in this setting is video analysis software, which allows for detailed, retrospective reviews of matches and training sessions (Barlow et al., 2024). These videos are not simply for highlight reels; rather, they are dissected frame-by-frame to uncover tactical patterns, positional errors, and successful executions. The feedback from these reviews is then used to inform future training sessions and match preparation. This process allows coaches to adjust strategies based on evidence, giving them a more accurate picture of performance than observational recall alone could offer (Lord et al., 2020). Video analysis is perhaps the most visible and commonly used form of PA in performance sport. Analysts compile clips that highlight specific moments in a match, such as successful executions or tactical moments, and present them in a concise and accessible format (Giblin et al., 2016). This can be down to the previously mentioned benefits of PA technology in the removal of a reliance on coaches memory recall for the provision of feedback, allowing the feedback to be now based on quantifiable data and results in coaches and players acting on precise insights to make informed decisions (Jones et al., 2020). This objectivity allows for the detailed analysis of both individual movements and collective team structures contributing to more intelligent play and improved co-ordination on the field. This was highlighted by one of the players interviewed in Brummer (2019), when he disclosed “Videos draw your attention to zones on the pitch or other players that you normally ignore. Video analysis helps you become more flexible and find different options during play” which shows how PA contributes to more intelligent play and improved co-ordination on the field (Brümmer, 2019).

In addition to supporting feedback and learning, PA serves a critical role in preparing for opposition. Performance teams use PA to study upcoming opponents in detail, analysing their tactical structures, key players, set-piece routines, and overall style of play (Francis & Jones, 2014). Athletes in performance settings increasingly rely on this kind of data to benchmark their performance and identify areas for personal growth (Groom & Cushion, 2005). This form of comparative analysis motivates players and gives them a clearer understanding of what is required to compete at the highest level. Knowing the tendencies of an opponent can be the difference between success and failure, particularly in high-stake competitions where fine margins often separate winners from losers (Francis & Jones, 2014).

Subsequently PA technologies are now embedded throughout the high performance cycle, not only during in-match analysis but also in training and recovery (Harsha Vardhan Goud et al., 2019). Performance sporting environments have seen rapid growth in the adoption of new technologies, with clubs and national teams investing heavily in data systems. These

tools are capable of capturing granular details—from total distance covered, sprint frequency, and acceleration data, to physiological markers such as heart rate and fatigue levels (Young et al., 2020). While these advancements offer new insights, there is also a need for caution. However not all performance analysis tools are inherently valuable; sometimes, teams adopt tools that focus only on what is measurable rather than what is meaningful. Analysts and coaches must ensure that the data collected aligns with learning objectives and performance goals, rather than becoming slaves to the numbers (Barker-Ruchti et al., 2021). Therefore, successful integration of PA into performance sports requires the analyst to interpret data meaningfully and communicate it effectively, in turn increasing the workload and responsibility placed on analysts in elite environments (Mulvenna et al., 2024). These increased responsibilities often involve creating tailored presentations or feedback loops that reinforce the team's tactical priorities. The role has expanded to the point where analysts are now seen as integral members of the coaching staff, frequently involved in player meetings, team strategy sessions, and training design (Bateman & Jones, 2019).

Given this context, feedback is not just a tool for instruction but a mechanism for learning, motivation, and reflection through the development of relationships between the coach-analyst and the player-analyst through communication . This makes the timing and focus of feedback vitally important in performance sport, where the ability to act quickly and precisely on performance insights can significantly affect outcomes (Kojman et al. 2020). In high-pressure, results oriented environments, feedback is often short-term and performance-focused, designed to yield immediate impact. However, balancing this with long-term developmental feedback is essential for sustained performance growth. When feedback is framed correctly, it reinforces positive behaviours and identifies clear paths for improvement. This psychological dimension of feedback can also affect motivation, confidence, and engagement, making the role of the analyst as a communicator just as vital as their technical expertise (Corbett et al., 2024). We can see how effective feedback can feed into another important dimension of PA in performance sports is its contribution to in-game decision making. Furthermore, with technological advancements enabling real-time data capture, analysts can provide immediate insights to coaching staff during matches. This allows for tactical adjustments based on live performance data. For example, if a team's possession rate or defensive structure deviates from the planned strategy, the analyst can alert the coach and suggest adjustments. This dynamic use of PA reinforces its value as a live support tool, not just a post-match review mechanism. The integration of real-time analytics has transformed the coaching process, making it more responsive and data-informed (Lord et al., 2020). The use of PA fosters a culture of accountability among players. When athletes are shown objective data detailing their individual contributions—or lack thereof—it promotes self-awareness and

drives performance. The presence of PA in performance teams has changed the expectations placed on athletes. Players are now expected to be more tactically disciplined and to conform to team systems (McLean et al., 2017). Creative or erratic play is increasingly viewed as risky or inefficient unless it can be justified within the broader tactical framework. PA has thus become a cultural force in elite sport, influencing not only how performance is measured but also how players are expected to behave (Brümmer, 2019).

In summary, PA in performance sport is far more than a set of tools or a support service; it is a strategic pillar of the high-performance model. From pre-match opposition scouting and in-game tactical feedback to post-match debriefs and long-term player development, PA is deeply embedded in all facets of elite sport. Its effectiveness hinges on the skill of the analyst, the quality of communication, and the strategic integration of technology into the coaching process. When implemented effectively, PA enhances the efficiency, intelligence, and adaptability of elite teams, offering a significant competitive edge in the pursuit of excellence.

2.7 Performance Analysis within Gaelic Games

The Gaelic Athletic Association (GAA) is an Irish amateur sporting organisation that was founded in 1884. It is one of the cornerstones of Irish culture, with each parish across the country typically having a GAA team to represent it. The best players from each of these club teams are selected to represent their county in the All-Ireland Inter County championship. The level of intensity in which these elite inter county players train and play at is akin to the levels reached by professional athletes in other sporting codes such as Australian Football League athletes (Brown, 2016). With the shift in approach to training and match preparation at the elite inter-county level to mirror other professional sports, there has been an increase in the use of PA tools and methodologies which has made PA a highly prominent feature of modern Gaelic Games (McGuckin et al., 2020). This highlights how despite the GAA's amateur status, it in no way equates to low levels of performance or professionalism. Yet this scenario of an amateur structure with professional demand places strain on the systems supporting these athletes. For PA, this means analysts must find creative, efficient, and practical methods to support coaching while operating within constrained environments (McGuigan et al., 2018). This level of commitment necessitates equally detailed and rigorous systems for feedback and development, which PA provides. However, the extent of PA implementation across the GAA is not uniform, with more advanced usage concentrated in elite inter-county setups, while grassroots levels continue to face barriers due to time, knowledge, and financial constraints. Moreover, PA use in the GAA is influenced by broader factors such as coach experience, institutional support, and access to infrastructure, elite-level coaches are not only more likely to use PA but also more inclined to see its value (Martin et al., 2017). From a GAA perspective there can also be barriers to coaches, at a non-performance focused level, having access to video, with only 49% of

coaches surveyed in the GAA having access to video (Martin et al., 2017).

One of the main functions of PA in the GAA is the identification and analysis of KPIs. These metrics are variables statistically associated with successful outcomes, such as winning games. Research by Clear et al. (2017) was pivotal in establishing some of the first comprehensive KPI benchmarks in elite-level hurling. Their study identified variables such as total shot count, total shot efficiency, shot count from play, and shot efficiency from play as having a strong relationship with match outcomes. Through their analysis, they concluded that a shot efficiency rate of around 57% would win most matches. This type of data helps teams define what constitutes a successful possession and allows them to set clear targets for performance. Supporting these findings, Byrne and Byrne's (2015) examination of the Kilkenny senior hurling team's 2015 season reported an average shot efficiency of 54%, further reinforcing the relevance of shot efficiency as a KPI. When coaches and analysts can correlate specific statistical thresholds with success, they are better positioned to structure training sessions, select players, and set tactical priorities around achieving these outcomes (Clear et al., 2017). A similar study analysed shooting, possession, and puck-out data and concluded that winning teams not only generated more scoring opportunities but also displayed superior shot accuracy, particularly from free-takers. This reaffirms the idea that in the GAA it is not just about volume but also quality and that effective coaching must address both facets (O'Brien et al., 2021).

The strategic use of PA in the GAA is not only about collecting statistics but about using those statistics to shape coaching decisions and tactical preparation. Integrated PA systems that allow for the comparison of performances across multiple dimensions, such as game phases, possession chains, and set-pieces have been advocated for. This more holistic approach enables teams to use PA as a strategic development tool, rather than simply a mechanism for post-match evaluation (Carroll, 2013). PA, when used effectively, can play a central role in player development by helping identify positional requirements, fitness profiles, and technical strengths and weaknesses. This supports not just short-term tactical planning but also long term player development, especially important for underage squads and development panels (McGuckin et al., 2020). Although much of the research focuses on elite senior teams, the relevance of PA for youth development is also growing. Youth Talent Development Squads are beginning to adopt PA systems to aid the holistic development of young players. These systems are integrated into training programmes and used to teach game understanding, tactical awareness, and decision-making; skills that are not easily taught through traditional coaching alone (Cuthbert et al. 2018).

Despite these advancements at elite level, the use of PA at grassroots remains relatively

underdeveloped. A survey of GAA coaches found that only 49% actively engaged with PA tools in their coaching. The data showed a divide between coaches operating at elite inter-county level and those working in less resourced club settings. More experienced coaches with formal coaching qualifications were more likely to use PA regularly, integrating it into both match-day and training analysis. Of those coaches using PA, 81% recorded match statistics, but only 49% had access to video footage for further review, highlighting a major limitation in the system's effectiveness due to restricted access to technology. Despite these limitations, coaches who did implement PA in their programmes overwhelmingly endorsed its benefits. Approximately 88% described PA as "essential" to their coaching practice, suggesting a high perceived value among users, even if the infrastructural support for widespread adoption is currently lacking (Martin et al., 2017). It should be acknowledged that this survey represents the PA landscape in the GAA at a single point in time, and access to video technology has likely improved since 2017 given the increasing affordability of recording equipment and analysis platforms. In the absence of more recent survey data this remains a limitation of the available evidence, and the routine use of video analysis with both the Under-15 squad and the university teams examined in this thesis would suggest that access may now be less restricted than these figures imply, although the major barrier to the use of video for PA across all levels of the GAA remains funding. Another challenge in embedding PA into Gaelic games is the knowledge gap in understanding how to interpret the data provided. Sports in the early stages of PA integration often struggle to understand the meaning and practical application of the data presented to them. This is particularly true for coaches and players who are unfamiliar with the analytical process and may find the statistics overwhelming or disconnected from their actual coaching needs. This challenge is especially evident for coaches and players, who may lack familiarity with performance analysis processes and struggle to interpret statistical outputs without appropriate guidance. This is where the analyst plays a pivotal role as not only the provider of information but also as the educator who bridges the gap between raw data and practical application (Kojman et al., 2022).

2.8 Summary

The literature presented in this chapter demonstrates that performance analysis has progressed from simple notational recording to a central element of contemporary coaching practice. Researchers consistently show that PA now operates as an integrated, relational, and communicative process that supports decision making and shapes how coaches understand performance (Mackenzie & Cushion, 2013; Wright et al., 2013). This evolution places new demands on analysts, who must not only manage data but also present it in a form that is meaningful to coaches and players. The applied PA literature highlights the importance of trust, clarity, and collaborative working relationships, noting that the quality of the analyst–coach

relationship can determine how effectively information is used within the coaching cycle (Bampouras et al., 2012; Huggan et al., 2015; Martin et al., 2021).

A second theme in the literature concerns communication. Studies show that communication in sport is shaped heavily by context, with in-game communication operating under unique time pressures and cognitive demands (Mason et al., 2020; Mouchet et al., 2014). Coaches are required to judge when and how to deliver information, while avoiding overloading players during moments of stress or heightened attentional demand (Guzmán & Calpe-Gómez, 2012). For youth players, these considerations become even more pronounced. Research suggests that younger athletes differ in how they attend to, interpret, and remember performance messages, and that consistent, well-structured feedback can support the development of game understanding over time (Johnson-Kozlow et al., 2006; Partington et al., 2014). Despite this, little empirical work has examined how youth athletes perceive or recall the messages delivered to them during live match play, particularly when those messages are grounded in real-time analysis.

The literature also highlights how KPIs create a shared focus for both coaches and analysts. In hurling, KPIs such as puckouts, shooting accuracy, and contested possession have been shown to contribute meaningfully to match outcomes and tactical planning (Clear et al., 2017; Falconer et al., 2025; O Brien et al., 2021). These indicators provide structure to coaching conversations and help frame both pre-match expectations and post-match reflections. However, the extent to which players internalise these indicators, or how well their perceptions align with coaching emphasis during a match, remains unclear. Similarly, although real-time analysis is increasingly common in applied environments, there is limited evidence on how such information is filtered to coaches, how it shapes half-time and in-game interventions, or how players engage with it in practice.

In summary, the literature provides a strong foundation for examining PA as part of a wider communication system. It also highlights important gaps in understanding how PA messages are delivered, interpreted, and retained by players, especially in youth and developmental contexts. These gaps create a clear rationale for the empirical work that follows. Chapter 3 addresses these issues directly by analysing in-game communication, half-time messaging, and player recall within an Under-15 hurling talent development squad, providing detailed insight into the alignment (or misalignment) between what coaches emphasise and what players perceive. Chapter 4 extends this investigation into a third-level environment, which gives us an insight into performance focused athletes as given the demographic of those involved in 3rd level Gaelic Games competitions they are generally playing inter county Football/Hurling so they would have previously been exposed to the standard of these

performance environments. It is also allowing comparison across two stages of the athlete pathway, and offering a broader perspective on how performance analysis is integrated into the coaching cycle in applied Gaelic games settings. Together, these studies contribute new understanding of how PA shapes communication and learning within hurling, and how players at different stages of development engage with the performance messages intended to guide their play.

Chapter 3: Match Day Coaching Communication, Performance Analysis, and Player Recall in Under-15 Hurling Talent Development Squad: A Mixed Methods Case Study

3.1 Introduction:

The Gaelic Athletic Association (GAA) serves as the governing body for two of Ireland's most prominent sports, Gaelic Football & Hurling. With approximately 2,200 GAA clubs spread across Ireland's 32 counties, players typically compete for their local parish teams, while the most talented athletes go on to represent their County at inter-county level (McGuigan et al., 2018). The popularity of these sports is outlined by the fact that the All-Ireland finals attract a huge viewing audience on top of an attendance in excess of 82,000 in Croke Park (Carroll, 2013). Although Gaelic Games remain amateur sports, athletes competing at inter county level undertake rigorous, quasi-professional training regimes (Gamble et al., 2019). GAA players professional approach to training leads them to possess physiological profiles comparable to those of athletes in professional sports such as Australian rules football, which is demonstrated by the close relationship between the two codes and the number of Irish Players plying their trade in the AFL (Brown, 2016).

Performance Analysis (PA) has become a crucial component of sports science, systematically examining sporting performance to generate valuable insights that inform coaching strategies (Martin et al., 2021). Notational analysis has been in sport since the 19th century, however early data collection relied predominantly on manual methods such as hand notation, which constrained both the accuracy of the data and the breadth of its application due to efficiency limitations (Hughes et al., 2008). Advances in technology have transformed retrospective performance analysis, facilitating more precise and comprehensive analysis (Lord et al., 2020). Over the past two decades, PA has expanded significantly, particularly in the domains of notational and match analysis (Wright et al., 2012). Initially this approach was predominantly employed within professional environments with Wright (2012) highlighting the substantial increase in the use of PA within professional football clubs over the previous decade.

Modern performance analysis techniques have drastically transformed how coaching staff evaluate team performances. Innovations in technology now enable game events to be registered and quantified in real-time at pitch side, facilitating the collection of vast amounts of data that can be implemented immediately to influence in-game decisions (Sarmento et al.,

2015). These technological advancements have introduced new dimensions into sports, enhancing teams analytical capabilities (Harsha Vardhan Goud et al., 2019). For example, video systems enable the identification of both opponents strength and weaknesses of directly informing tactical preparations for upcoming matches (Brümmer, 2019). The vast array of available analytical tools can create difficulties for coaches in selecting the most appropriate system for their needs. This highlights the necessity of a well-qualified and knowledgeable performance analyst, who can effectively interpret data and guide its application within the coaching process (Andersen et al., 2022). While much of this evidence has been generated in professional environments, the same principles of data informed decision making increasingly apply in talent development settings, where the focus shifts from immediate outcomes towards using analysis to support player learning and progression, which is the context for the present study.

The role of the performance analyst is crucial in bridging the gap between technological advancements and actionable insights in sports, thereby significantly influencing decision making processes (Mackenzie & Cushion, 2013). Beyond their technical responsibilities analysts play a pivotal role in the feedback process, requiring a diverse skill set to engage with all aspects of their role (Martin et al., 2021). Performance analysts perceive their primary function as enhancing the decision-making process, ultimately contributing to successful sporting outcomes (Martin et al., 2024). With the increasing reliance on quantitative data, performance analysts not only provide objective information but also employ contextual intelligence to ensure that data interpretation is meaningful and directly relevant to improving team performance (Wright et al., 2014). This highlights the evolving scope of their role which, now extends beyond data collection and analysis to direct integration within the coaching process, where their insights actively shape coaching strategies and decisions (Nicholls et al., 2019).

The role of the performance analyst continues to expand with effective communication being a cornerstone of the performance analysts role, particularly in interactions with coaching staff and key stakeholders. Martin and colleagues (2021) emphasise that effectively reporting information to these stakeholders is the most critical aspect of applied PA (Martin et al., 2021). Nelson and colleagues (2023) found that trust and respect from coaching staff are essential for fostering open and productive relationships, with 88% of analysts surveyed strongly agreeing that appearing trustworthy is paramount in applied practice (Nelson et al., 2023). Furthermore, Martin (2022) identifies relationship-building as one of the five key components of applied performance analysis, underscoring the significance of the coach-analyst dynamic for successful performance analysis delivery (Martin, 2022). However, this relationship often involves a power imbalance, with the coach typically holding authority while analysts may feel

pressure to conform (Bateman & Jones, 2019). The quality of this relationship directly affects an analysts productivity and influence: those who feel valued by their coaches tend to deliver higher-quality analysis, where as those who feel undervalued may see their contributions diminished (Huggan et al., 2015).

Beyond the coach-analyst relationship, analysts must also foster connections with players, who serve as critical stakeholders in the analysis process. Analysts play a crucial role in enhancing the player learning experience while simultaneously supporting coaching staff (Francis et al., 2024). However, player engagement with PA varies, with some athletes demonstrating greater investment than others (Groom et al., 2012). This variability underscores the need for analysts to tailor their approach, recognising individual preferences and determining the most effective methods of delivering information. Despite its importance, research on player interaction with performance analysis and their attitudes towards engagement remains limited (Francis & Jones, 2014). Wright and colleagues (2016) suggests that while players appreciate involvement in the feedback process, they prefer concise sessions, typically lasting no more than 30 minutes. Building trust and collaboration across all stakeholders is essential for maximising the effectiveness and influence of performance analysis within a team structure (Wright et al., 2016).

Wright and colleagues (2013) found that 89% of analysts surveyed consider the coach-analyst relationship to be of paramount importance (Wright et al., 2013). The coach serves as the intermediary between the analyst and the players, determining which information is communicated, effectively acting as a gatekeeper (Bampouras et al., 2012). While this structure facilitates streamlined communication, it can also lead to instances where analysts feel compelled to withhold errors, reinforcing the need for a strong, trust-based relationship between the coach and the analyst (Nelson et al., 2023). Additionally, the potential for bias exists, as coaches may selectively present data to justify tactical decisions, underscoring the importance of transparency and open dialogue (Painczyk et al., 2017).

In the first instance, establishing key performance indicators (KPIs) is a crucial first step in the collaboration between coaches and performance analysts (Lord et al., 2020). The development of KPIs must be grounded in a strong, communicative relationship between the coach and the analyst to ensure that the performance metrics selected align with the team's broader coaching philosophy, strategy and tactics (Wright et al., 2013). Typically KPI's are decided upon jointly by the coach and the analyst, with the goal of implementing indicators that not only accurately reflect the team's objectives but also enhance the effectiveness of the coaching process by providing a motivating target for players to achieve (Falck & Karlsson, 2011). We have discovered that the role of the performance analysts extends beyond merely

collecting data (Martin et al., 2021), they must also be able to critically decide which factors were pivotal in determining the outcome of matches. Through their analysis, analysts help to identify the key elements that contribute to both success and failure, providing insight into how these factors can influence future performances (Morgulev & Lebed, 2024). In the long run well-chosen KPIs help to differentiate between successful and unsuccessful teams, offering a structured way to elevate performance while aligning closely with team's tactical and strategic goals (Watson et al., 2017). The process of establishing effective performance indicators is key to the effective use of performance analysis in sports (Gómez-Ruano, 2018). It ensures that both the analyst's work and the subsequent data-driven decisions made by the coaching staff are targeted, relevant and capable of delivering measurable improvements in team performance (Herold et al., 2021).

GAA coaches working within inter-county set-ups, both performance or talent development focused, engage–extensively with performance analysis to improve team performance (Martin et al., 2017). In the sport of hurling, performance analysts, like their counterparts in other elite sports aim to identify KPI's associated with success. While research in PA has grown, hurling remains somewhat behind in terms of academic enquiry (O'Brien et al., 2021). However emerging studies are beginning to shape the field. For instance, research conducted by Clear and colleagues (2017) on attacking play in hurling identified shot count and shot efficiency as critical KPIs for the sport (Clear et al., 2017). Such findings are crucial in helping analysts and coaches better understand the factors that contribute to success in hurling.

This study seeks to build upon these findings by examining the impact of PA on Talent development hurling teams and the significance of the coach-analyst relationship in this context. It will explore the implementation of PA within talent development environments, typically structured through talent development squads designed to develop young athletes (Cuthbert, 2018). By addressing this gap in the literature, this research aims to enhance the understanding of PA in Gaelic games and its integration into underage talent development in amateur sports.

In a talent developmental environment, PA has emerged as a crucial educational and developmental tool. In these talent development settings coaches and analysts work to align PA tools with long term player development instead of focusing on short-term outcome focused results (Reeves & Roberts, 2013). Analysts in these settings are required to spend a significant amount of time planning and delivering the learnings from the analysis however given the setting they aim to keep the presentation of data concise to allow the development players engage and retain the information to enhance their learning (Jones et al., 2020). The application of PA at a youth development level is vital in order to prepare the players for future performance

demands (Martin et al., 2017). Analysts also need to educate these development players as to the importance of the data being recorded and how it can benefit their development. This will encourage the player to engage meaningfully with the PA which in turn should aid their performance (Araujo et al., 2013). The importance of analysts in player development is their employment in elite youth football academies in England as they are seen as key stakeholders in the development of youth athletes (Herold et al., 2021). The specific characteristics of talent development environments also shape how PA is used and received within them. Effective TDEs are characterised by long term aims and methods, coherent support networks and an emphasis on learning and development over early selection and short term results (Martindale et al., 2005; Henriksen et al., 2010). Players at this stage of the pathway may have had little or no previous exposure to PA, meaning that feedback must be carefully scaffolded and introduced gradually so that players can build the skills needed to interpret and act on performance information. The developmental orientation of these environments also means that performance outcomes carry less weight than learning, which alters how feedback should be framed by the coach and the analyst. Furthermore, factors such as the relative age effect and the ongoing physical and cognitive maturation of players mean that performance data must be interpreted cautiously when comparing players of the same chronological age (Cobley et al., 2009). These characteristics informed how PA was delivered and communicated within the present study.

The coach or manager plays a central role in communicating with players during both training sessions and matches. However, the nature of communication in these two contexts is distinct, and while communication during training is crucial for skill development and tactical understanding, in-game communication requires careful consideration regarding its timing and delivery (Mouchet et al., 2014). Despite extensive research on coach communication and behaviour in training settings, there is a notable lack of research examining in-game communication (Mason et al., 2020). As the gatekeeper of information, the coach must carefully assess the appropriate timing and volume of feedback provided to players during a match. Excessive feedback, such as offering instructions after every action, may impede an athlete's ability to independently assess and correct errors, potentially leading to an over reliance on the coach's guidance (Guzmán & Calpe-Gómez, 2012). Therefore, effective in game communication requires a balanced approach – ensuring that players are adequately informed without compromising their autonomy or decision-making capacity. The type of feedback coaches provide during games is often shaped by the context of the match, with research indicating that coaches tend to offer more positive than negative feedback during games, with this tendency becoming even more pronounced when they are coaching a winning performance (Mason et al., 2020). However, further research is required to understand how different game situations shape a coach's communication strategies. Through this study, we aim to contribute

to this growing field by investigating the influence of game context on coach communication, thereby enhancing the understanding of best practices of in real-time performance feedback.

This study aims to address three key areas regarding the performance analysis process and it's role within the coaching cycle. Firstly we examine the communication that occurs throughout the PA match day process and how players in an talent development coaching setting perceive and recall this information. Secondly, we aim to investigate the frequency and type of communication that coaches use as part of the PA process. Thirdly, we aim to examine players' ability to recall information as part of the performance analysis process, assessing how effectively they retain the feedback provided. We also looked at the role game context played in regards to this. By addressing these three areas, the study aims to provide a comprehensive understanding of how PA integrates with coaching and its impact on both communication and decision-making at a talent development level.

3.2. Research Methodology

3.2.1 Study Design

This study employed a mixed-methods case study design to investigate communication and performance analysis processes within a hurling talent development environment. The methodology included multiple data sources, including; (a) in-game audio recordings of coach communications, (b) post-match player questionnaires on performance recall, and (c) content analysis of half-time team talks. Specifically, a convergent parallel mixed methods design was adopted, in which the quantitative and qualitative strands were collected within the same competitive period and integrated during interpretation (Creswell & Plano Clark, 2018). The quantitative strand comprised the post-match player recall questionnaires and the coach communication tallies, while the qualitative strand comprised the content analysis of half-time team talks. This design was appropriate because no single data source could capture both the volume and type of communication delivered and how that communication was perceived and recalled by players, and integrating both strands allowed the communication patterns observed during matches to be compared directly against the players' perceptions of them. The context for this case study was an intercounty under-15 hurling team, which within the Gaelic Athletic Association (GAA) structure, represents an early stage in the athlete development pathway.

The study was conducted across four competitive matchdays during a single season. The performance analyst was stationed on the sideline alongside the coaching team, which typically included two coaches and, on occasion, a third. The analyst was not confined to a specific area on the sideline and was allowed to move up and down it freely in order to obtain the best vantage point for recording the data. Every 15 minutes of play it was agreed that the analyst would feed any potentially significant statistical trends to the manager however it was

not confined to this period with the analyst permitted to engage with the manager when the analyst deemed it necessary. The team manager remained constant across all games. All in-game communication between the coaching staff and the analyst, and the players were recorded using a SONY IC Recorder ICD PX370. Given that participants were under the age of 18 (Born in 2009), ethical approval was obtained through the institutional review board, including the acquisition of parental consent and participant assent. All participant data were anonymised, and individuals retained the right to withdraw at any stage prior to data submission.

3.2.2 Participants

Participants included all members of the Dublin U15 hurling squad who played in the four selected matches. Inclusion criteria were participation in at least one match and completion of the post-match questionnaire. Sampling was purposive, aiming to reflect the full squad's exposure to coaching feedback during competitive play.

3.2.3 Data Collection

3.2.3.1 In-Game Communication

All sideline communication between coaches and players was recorded across the four matchdays and securely stored in encrypted format. Audio files were transcribed verbatim, and timestamps and speaker identifiers were included for accuracy. Transcripts were used to construct structured tables summarising each communication event, including: timestamp, speaker, exact quote, type of instruction (praise, negative, instructional, encouraging), content category (technical, tactical, motivational), game context, and match score (See example in Table 2). These tables allowed for a detailed analysis of when and how coaches communicated during the match, as well as the specific game situations in which communication occurred.

Through the consistent engagement of the coach and the analyst with how the players were performing in line with the KPIs the coach was able to make any tactical adjustments required to try help the players reach the desired level of performance. These changes would be explained to the players either in real time or in post-game debriefs to enhance their learning and understanding of how the tactical changes made impacted the outcome of the game or performance.

Table 3.1 Example of data collected during match day and how it was recorded

Timestamp	**Speaker**	**Message Delivered**	**Type of Instruction**	**Game Context**	**Score**
The time on the audio in which the communication took place	The member of the coaching staff who was delivering the message	Quote of what was said by the speaker	The messages delivered were categorised based on the content/delivery of the message	The context of what was going on in the game when this message was delivered	The score of the game when this message was delivered

Communication categories were adapted from Corbett et. al. (2024), combining the most relevant pieces and applying them to our situation (Technical instruction, tactical instruction, praise/encouragement) with necessary modifications to reflect the specific linguistic and tactical context of elite youth hurling. Negative and motivational were modifications added to reflect potential communication types to the players. Our communications were detailed into technical, tactical or motivational and within these they were categorised into praise, negative, instructional or encouraging which helped to identifying each type of communication from the coaching staff accurately. This deductive coding framework was deemed suitable for the present study due to its capacity to classify different types of verbal instructions, namely; praise, negative, instructional, and encouraging to identify the tone/intent of the messaging communicated by the coach. This also enabled categorisation into content domains of technical, tactical, and motivational emphasis which highlighted the contents of the information being delivered. This aligns with the study's aim of exploring not just the volume, but the quality and intent of coaching communication.

The coding process was rigorous and systematic. Verbatim transcripts were imported into a structured coding matrix (see example in Table 3.2), with each unit of speech treated as a discrete entry. Two independent coders coded the data separately to enhance analytical rigour. Coding guidelines were co-developed and piloted on a subset of the data to ensure shared interpretation. Inter-coder reliability was calculated using Cohen’s kappa, and values above 0.80 were considered acceptable for categorical agreement (Warrens, 2015). Discrepancies were resolved through a negotiated consensus process.

To further contextualise verbal communication, video footage was synchronised with the audio timeline. This multimodal alignment enabled the coders to accurately interpret tone, body language, and the on-field scenario surrounding each message. Integrating video with

audio enhanced both the reliability and ecological validity of the communication categorisation. Ultimately, this method allowed for a detailed and credible assessment of how specific types of coach feedback were embedded within dynamic, in-game moments and contributed to the broader performance analysis framework of the study.

Table 3.2 Types of Communication Examples from in-game comms.

Types of Communication	**Technical**	**Tactical**	**Motivational**
Praise	"Score Jack, well done	"Good set up, well done"	"No fault James, good stuff"
Negative	"Ah come on lads it has to go to hand"	"Switch on. Come on quicker"	"Come on that's too much ball there"
Instructional	"Put it down and move it"	"Cover the goal, cover the goal"	"Get on it come on"
Encouraging	"Keep working, keep working"	"Come on Dan"	"Come on Jack now. Come on"

3.2.3.2 Half-Time Team Talk Analysis

Verbal feedback provided from coach or analyst to players at half-time was isolated from the full match audio and transcribed separately. A content analysis was conducted to quantify the frequency of references to the five pre-identified KPIs. Coding was conducted manually, with each KPI assigned a unique code. Instances of each KPI were tallied, and illustrative quotes were extracted to contextualise each reference. Coding was performed by two researchers independently, with inter-rater agreement assessed to ensure reliability (Elo & Kyngäs, 2008; Graneheim & Lundman, 2004; Hseish & Shannon, 2005).

This comprehensive data collection and analysis approach allowed for an in-depth understanding of coach communication strategies and their relationship to game context, providing a valuable insight into the performance analysis process and its role within the coaching cycle.

3.2.3.3 Post-Match Player Recall Questionnaires

The questionnaire aimed to capture players' recall of five specific Key Performance Indicators (KPIs) emphasised by the coaching team: (1) Our Puckouts, (2) Opposition Puckouts, (3) Our Shooting, (4) Opposition Shooting, and (5) Our 60/40 Balls. Operational definitions for each KPI were based on existing hurling performance literature and provided to players within the questionnaire (Table 3).

The rationale for focusing exclusively on these five KPIs stemmed from their prominence in the team's tactical framework and their frequent use as focal points in both

training and competition contexts. These indicators were selected due to their observable nature and relevance to in-game decision making, thus reducing the cognitive demand on young participants and enhancing the reliability of their responses (Morley et al., 2014; Niforatos et al., 2018). By narrowing the scope of recall, the study aimed to ensure consistency across participant feedback while maintaining alignment with previously identified tactical priorities in hurling performance analysis literature (O'Brien et al., 2021). This targeted design allowed for a developmentally appropriate exploration of how coaching messages were perceived, prioritised and internalised by players.

To minimise bias, players completed the questionnaire without access to video footage. Questionnaires were distributed digitally via Google Forms shortly after each match, with reminders sent to parents to encourage participation. Section 1 of the form obtained assent and confirmed participants' understanding. Section 2 included cue-based prompts aligned with the KPIs to support recall, building on memory enhancement strategies validated in youth research (Johnson-Kozlow et al., 2006).

Players were asked whether each KPI had been discussed by coaches during the match (yes or no). If "yes", they were prompted to rank the relative emphasis placed on different aspects of the KPI using ordinal response categories (e.g., “Most Talked About”, “Talked About” and “Least Talked About”). The use of this ranking approach was guided by a previously used methodology which examined recall strategies (Johnson-Kozlow et al., 2006). Finally, players ranked the overall importance (least to most) of each KPI in terms of in-game communication.

Table 3.3 Operational Definitions used by Dublin u15 Hurlers for PA

Performance Indicator	**Definition**
Our Puckout	Measuring the outcome of all the time the Dublin u15 goalkeeper restarted the game after the ball had gone wide or after a score
Opposition Puckouts	Measuring the outcome of all the time the opposing team's goalkeeper restarted the game after the ball had gone wide or after a score
Our Shooting	Measuring any time a Dublin player struck the ball in the direction of the goalposts with the intention of scoring
Opposition Shooting	Measuring any time a player off the opposing team struck the ball in the direction of the goalposts with the intention of scoring

Our 60/40	Balls Measuring the amount of times a Dublin u15 player won possession from a ball delivered from a Dublin u15 player towards another Dublin u15 player that is slightly favourable towards the Dublin u15 player aiming to obtain possession

3.2.4 Quantitative Data Preparation

Post game player questionnaire responses were downloaded from Google Forms and imported into Google Sheets for cleaning and coding. All categorical responses were numerically encoded (e.g. 1 = yes, 2 = no). The time a player spent on the field of play was also classified, (see Table 4), along with yes/no binary classification on match participation, and half-time huddle involvement.

KPI importance ratings were converted to a 5-point scale (1 = Least Important to 5 = Most Important). Sub-component rankings were similarly coded, with lower scores indicating greater emphasis. These values were used to calculate descriptive statistics (means, standard deviations) for each KPI across matches.

Table 3.4 Time Spent on the Field of Play by Each Player During a Game

Game Number	Time Spent on the Pitch
1	0-20 Minutes
2	20-40 Minutes
3	40-60 Minutes
4	60-75 Minutes
5	75-100 Minutes

Table 3.5 5 Point Scale Used by Players to rank KPIs in Terms of Importance

1	Least Important
2	Not Too Important
3	Important
4	Quite Important
5	Most Important

Subsequent to this the questionnaire asked them if they felt each of the 5 KPIs were talked about by the coaching staff. If the player indicated that they felt a topic had been talked about by the coaching staff they were required to answer follow up questions regarding the importance placed upon the KPI by the coaching staff throughout the game as well as which aspects of the topic were talked about by the coaching staff.

Table 3.6 Detailed topics for each of the 5 KPIs

Code	Our Puckout	Opposition Puckouts	Our Shooting	Opposition Shooting	Our 60/40
1	Good Short Puckout	Good Opposition Short Puckout	Our Shooting for Goals	Opposition Shooting for Goals	Positive 60/40 Balls
2	Poor Short Puckout	Poor Opposition Short Puckout	Our Shooting for Points	Opposition Shooting for Points	Negative 60/40 Balls
3	Good Long Puckout	Good Opposition Long Puckout	Our Wides	Opposition Wides	Improvement for 60/40 Balls
4	Poor Long Puckout	Poor Opposition Long Puckout	Our Shots Dropped Short	Opposition Shots Dropped Short	Opposition 60/40 Balls

Table 3.7 Ranking Scale placed on each of the detailed topics

Code	Ranking
1	Most Talked About
2	Talked About
3	Not Talked About

3.2.5 Data Analysis

Quantitative analysis was conducted using SPSS (v29). Descriptive statistics (means, standard deviations, frequencies) were calculated to summarise players' perceptions of KPI importance and frequency of coach communication. Where appropriate, inferential statistics were used to examine whether players' perceptions of performance priorities changed across the competitive cycle. Independent samples t tests were conducted comparing importance ratings reported in the first fixture and the final fixture for each of the five KPIs. This approach provided an indication of whether shifts in communication emphasis observed in real time were reflected in the perceived importance recorded by players at different time points. The alpha level was set at $p < .05$.

3.3 Results

Given the exploratory mixed methods design and the focus on context specific communication processes, the results are presented through a series of figures and tables. These provide clear visibility of the volume, type, and content of communication delivered during matches as well as players' perceptions of the relative importance of specific key performance indicators. Presenting the findings in this format allows the reader to observe variation across individual games and to distinguish between winning and losing performances, which is central to the aims of the study. The tables act as a supplement to the narrative that follows and are included to support transparency in how the communication patterns and perception data were derived.

With regard to Our Puckouts (Figure 3.1), mean importance ratings ranged between 4.00 and 4.33 across the four games, indicating a consistently strong emphasis perceived by players. The accompanying standard deviation values remained relatively stable, varying between 0.72 and 0.76, which suggests that there was broad agreement among players in how this area was prioritised.

For Opposition Puckouts (Figure 3.2), there was a clear increase in mean importance ratings from 3.53 in Game 1 to 4.40 in Game 4. This pattern is consistent with the increased focus placed on opposition restart possession as the season progressed. Standard deviation was more variable, ranging from 0.69 to 0.99, indicating greater variation in how strongly players perceived this emphasis at different time

points. In earlier games, ratings were more clustered, whereas in later games perceptions diverged slightly, although the overall trend suggested growing importance.

A similar pattern emerges when examining shooting related KPIs (Figure 3.3). Players consistently rated Our Shooting as more important than Opposition Shooting. Based on the numerical scales used, Opposition Shooting typically fell between "not too important" and "important", whereas Our Shooting tended toward "important" and, at times, approached "quite important". This distinction reflects the greater direct relevance that players may associate with their own scoring contribution compared with that of the opposition.

The standard deviation values for the shooting indicators (Figure 3.4) illustrate notable internal variation. Opposition Shooting produced the widest spread (1.175 to 1.389), signalling considerable variation among players in how heavily they weighted these messages. Our Shooting also displayed variation, although to a slightly lesser extent. These findings suggest that although overall trends were evident, individual perceptions varied across the group, likely reflecting different positional roles, minutes played, or involvement in scoring actions.

The perceived importance of 60 or 40 balls (Figure 3.5) followed an incremental increase across Games 1 to 3, alongside a reduction in standard deviation, indicating not only increased emphasis but greater convergence in players' perceptions. This suggested that repeated communication around contested possession may have had a reinforcing effect. Game 4 provides a contrasting case. Although mean importance declined to 3.667, standard deviation rose to 1.345, indicating substantial variability among players in how much value they attributed to this aspect. This pattern may reflect differences in individual involvement in contested possession situations or a shift in messaging priorities within that specific match context.

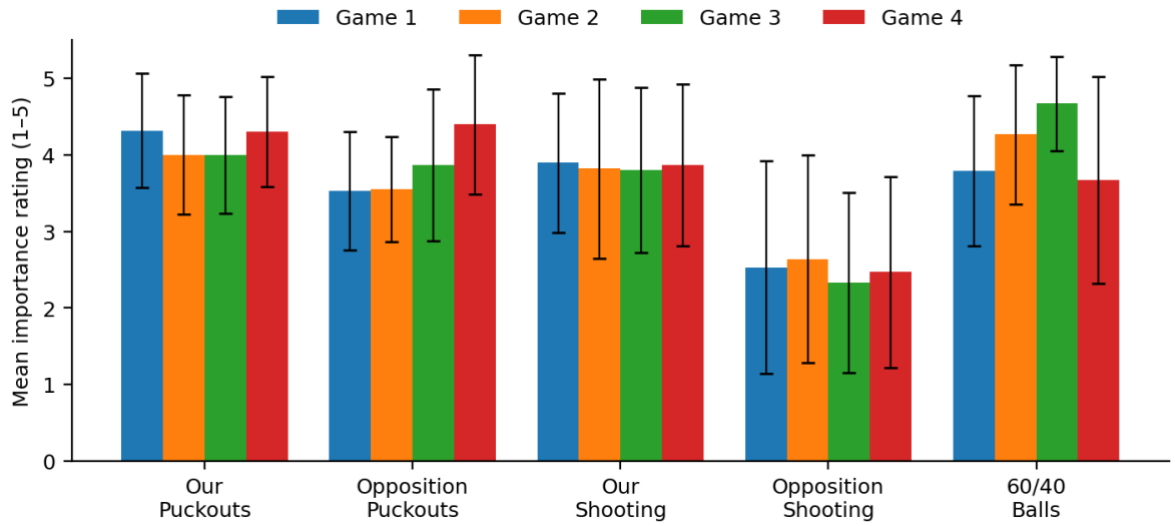


Figure 3.1 Mean importance ratings of the five KPIs across Games 1 to 4, with standard deviations presented as error bars. All values are presented on a consistent 1 to 5 scale. Game 1 Victory v Clare, Game 2 Loss v Wexford, Game 3 Loss v Tipperary, Game 4 Victory v Waterford in the Finals Game.

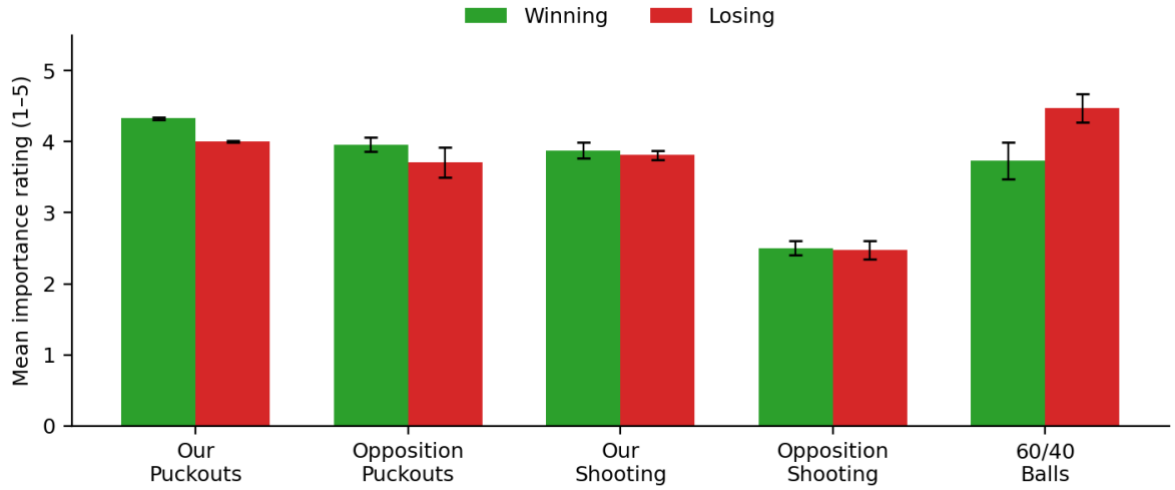


Figure 3.2 Mean importance ratings of the five KPIs in winning and losing games, with standard deviations presented as error bars. All values are presented on a consistent 1 to 5 scale.

3.3.1 Player Questionnaires in Line with Game Context

Across both winning and losing fixtures, the importance placed on Our Puckouts remained consistently high, with mean values of 4.33 in winning games and 4.00 in losing games (Figure 3.6). This indicates that players perceived this area as a central priority regardless of match outcome, which aligns with the emphasis observed during in-game and half time communication. The standard deviation values also suggest relatively strong agreement across the group, with limited variability in how players viewed the emphasis placed on puckout execution.

For Opposition Puckouts (Figure 3.7), the variability was greater. Although

mean importance remained relatively stable, there was more divergence in player perceptions in losing fixtures. The higher standard deviation in losing matches suggests less agreement regarding the emphasis placed on opposition restart possession when compared with winning performances. This indicates that, when under pressure, players differed more in how strongly they felt these messages were being communicated.

A similar trend is evident when examining shooting related perceptions. Regardless of match outcome, Our Shooting (Figure 3.8) was consistently rated higher than Opposition Shooting (Figure 3.9), with mean scores of 3.88 and 3.81 compared to 2.50 and 2.48 respectively. This reinforces the idea that players consistently perceived greater emphasis on creating and converting scoring opportunities rather than focusing on limiting opposition shooting. This pattern complements both the frequencies observed in verbal communication and the tactical approach adopted within match play.

The importance of 60 or 40 balls showed a notable contextual shift (Figure 3.10). In losing fixtures, players reported higher perceived emphasis on contested possession than in winning fixtures, alongside lower variability. This suggests greater shared understanding in difficult match situations, where securing possession was perceived as more central to performance. In winning fixtures, standard deviation was higher, indicating less agreement among players, which likely reflects reduced urgency around contesting marginal possession when the team was performing well.

Finally, inferential analyses were used to support these descriptive patterns. Independent samples t tests showed a statistically significant increase in perceived importance of 60 or 40 balls between the opening and final fixtures, $t(32) = 2.80$, $p = .008$, indicating that contested possession became increasingly important over time. No significant difference was found for Our Shooting, $t(32) = -0.21$, $p = .832$, demonstrating stability in perception. Opposition Puckouts approached significance, $t(32) = -1.93$, $p = .062$, suggesting trends toward increased perceived emphasis later in the cycle.

3.3.2 Coach Communication Tallies

The following section outlines the volume and frequency of in-game communication delivered by the lead mentor across the four competitive matches. Tallies were compiled from verbatim transcripts and are presented by match, with communication counts contextualised by match duration and outcome. The analysis includes a calculation of communication rate (communications per minute) to account

for differences in match length and mentor availability. This provides a comparative view of how verbal feedback intensity varied across winning and losing performances.

The communication tallies delivered by the lead mentor in the games was as follows; Game 1: 143 pieces of communication, Game 2: 107 pieces of communication (After 36 minutes due to the lead mentor being sent off), Game 3: 132 pieces of communication & Game 4: 82 pieces of communication (50 minute match). Games 1 & 4 were games in which we won while games 2 & 3 were games in which we lost.

The breakdown of Comms. per minute per game is as follows: Game 1 – 2.38 Comms. per minute; Game 2 – 2.97 Comms. per minute; Game 3 – 2.2 Comms. Per minute; Game 4 – 1.64 Comms. Per minute.

Table 3.8 Coach Communication Tally Table from Victory v Clare

Types of Communication	**Technical (88)**	**Tactical (42)**	**Motivational (13)**
Praise (41)	39 (27%)	1 (0.7%)	1 (0.7%)
Negative (1)	1 (0.7%)	0	0
Instructional (73)	32 (22%)	36 (25%)	5 (3%)
Encouraging (28)	16 (11%)	5 (3%)	7 (5%)

Table 3.9 Coach Communication Tally Table from Loss v Wexford *Note that this is only for a Across a 36 Minute period before the dismissal of the Lead Coach

Types of Communication	**Technical (53)**	**Tactical (35)**	**Motivational (19)**
Praise (16)	13 (12%)	1 (0.9%)	2 (2%)
Negative (1)	1 (0.9%	0	0
Instructional (80)	33 (31%)	32 (30%)	15 (14%)
Encouraging (10)	6 (6%)	2 (2%)	2 (2%)

Table 3.10 Coach Communication Tally Table from Loss v Tipperary Across a 60 Minute Match

Types of Communication	**Technical (78)**	**Tactical (47)**	**Motivational (7)**
Praise (30)	28 (21%)	1 (0.75%)	1 (0.75%)
Negative (2)	1 (0.75%)	0	1 (0.75%)
Instructional (89)	42 (32%)	45 (34%)	2 (1.5%)
Encouraging (11)	7 (5%)	1 (0.75%)	3 (2%)

Table 3.11 Coach Communication Tally Table from Victory in Finals Game v Waterford Across a 50 Minute Match

Types of Communication	Technical (41)	Tactical (41)	Motivational (0)
Praise (8)	8 (10%)	0	0
Negative (2)	2 (2%)	0	0
Instructional (71)	30 (37%)	41 (50%)	0
Encouraging (1)	1 (1%)	0	0

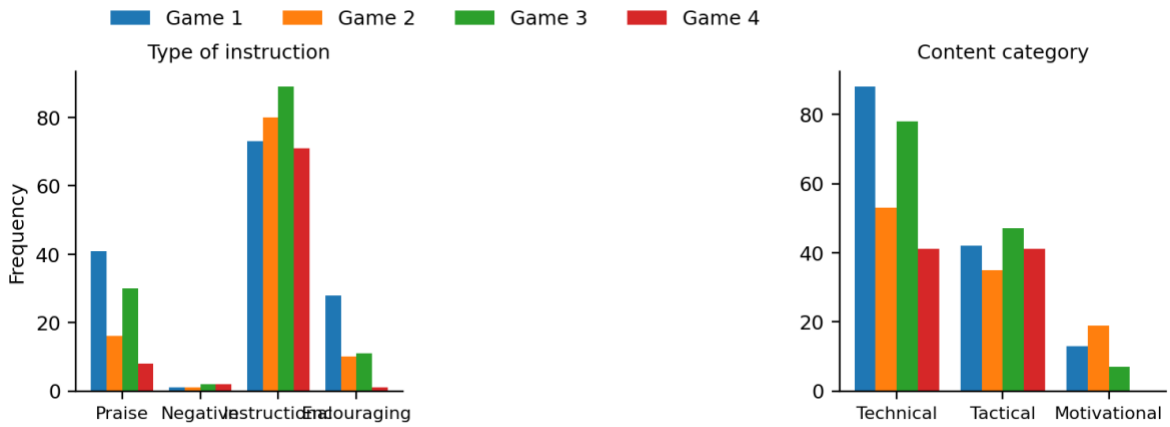


Figure 3.3 Consolidated presentation of the coach communication tallies from Tables 3.8 to 3.11, showing the frequency of each type of instruction and each content category across the four games. This figure allows direct comparison of the communication profiles across winning (Games 1 and 4) and losing (Games 2 and 3) performances.

3.3.3 Half Time Content Analysis

The following section presents the findings from the content analysis of half-time team talks across the four competitive matches. Tables display the frequency and context of references to the five pre-identified KPIs, illustrating how coaching staff communicated key tactical priorities. Representative quotes are included to exemplify how each KPI was framed during the debriefs. The half time content analysis from all four matchdays is consolidated in Table 3.12, with games presented as columns and KPI themes as rows to allow direct comparison across fixtures.

Table 3.12 Half Time Content Analysis across all four matchdays (frequency of references to each KPI theme)

Theme	**Game 1 (W)**	**Game 2 (L)**	**Game 3 (L)**	**Game 4 (W)**	**Total**	**Example Quote**
Our Puckouts	4	5	1	7	17	"We're about 50% on our long ones"
Opposition Puckouts	2	7	8	21	38	"When he goes short the full forward line press"
Our Shooting	8	10	4	5	27	"Better Angles, better shot selection"
Opposition Shooting	5	2	3	2	12	"They're on 70% conversion rate"
60/40 Balls	2	4	5	0	11	"Secure Possession"
Total	**21**	**28**	**21**	**35**	**105**	

There is a considerable increase in the volume of feedback given in Game 4 in comparison with the other three games, however it is heavily focused on puckouts, with puckouts accounting for 80% of the half time messaging, 75% of that being opposition puckouts. We can see that Opposition puckouts and Our Shooting were by far the most talked about coaching points during half time.

3.4. Discussion

This study set out to examine how performance analysis operates within the coaching cycle of an Under-15 hurling talent development environment and to explore how communication, tactical priorities, and player understanding interact during competitive match play. Three specific aims guided the research. The first aim focused on identifying the nature and content of communication across the match day PA process and how players perceived and recalled this information. The second aim concentrated on describing the frequency and types of communication used by coaches during matches. The third aim examined how players recalled PA related information and whether match context influenced this recall. The following discussion presents the key findings in relation to these aims and considers how they align with previous research in performance analysis, coach communication, and youth development.

The findings demonstrated that coaches placed consistent emphasis on a small number of key performance indicators across all four matches. This continued focus on puckouts and shooting reflects earlier research which highlighted shot count and

efficiency as central indicators of success in hurling (Clear et al., 2017). The data collected through the half time team talks supported this, as both our own puckouts and opposition puckouts appeared repeatedly in coaching messages. The emphasis on these KPIs appeared to hold across both winning and losing games, although the analysis also showed clear evidence of context driven communication. Contested possession, captured within this study under the heading sixty forty balls, was referenced more frequently in matches where the team was behind. Players also rated this KPI as more important in losing games. This pattern reflects findings from previous research which noted that coaches often adjust their feedback depending on the match situation and may focus more on effort based elements of performance when a team is struggling (Calpe et al., 2013). The present findings suggest that primary possession remains a critical theme for coaches in youth hurling and may warrant further investigation, particularly when examined in relation to match outcome.

An important contribution of the study relates to how players perceived and internalised the performance messages delivered by the coaching staff. The player questionnaires showed a gradual increase in the perceived importance of certain KPIs, most notably on 60/40 balls and opposition puckouts, across the four matchdays. While not significant, the increase in the perception of opposition puckouts supports descriptive findings that opposition restart possession became a greater tactical concern as the programme progressed. The statistically significant increase in perceived importance of 60/40 balls from the opening to closing games suggests that players became more attuned to contested possession over time, likely because this topic was emphasised repeatedly within half-time and in-game communication. This provides quantitative support for the argument that repeated messaging can shape player perception in developmental squads. This increase reflected the emphasis placed on this KPI by coaches during both in game and half time communication. The alignment between what coaches stressed and what players later recalled suggests that repeated and consistent messaging may support young athletes in attending to specific aspects of match play. Previous research indicated that player engagement with PA can vary considerably (Wright et al., 2016; Mackenzie & Cushion, 2013), although the present study suggests that when messages are clear, frequent, and linked to concrete match situations, players begin to develop a shared understanding of performance priorities. This is particularly relevant in youth sport where players are still developing their tactical awareness and are likely to benefit from repeated exposure to the same learning cues (Partington et al., 2014).

The findings also contribute to the limited PA research available within the context of Gaelic games. Although other studies have examined KPIs in hurling (Clear et al., 2017; O'Brien et al., 2021), few have directly linked coaching communication to player recall. The present study therefore offers new insight into how PA information is communicated and processed by athletes at a developmental age. The steady alignment between coaching messages and player recall indicates that PA can play an important role in supporting learning and tactical education within youth squads. This supports previous suggestions that PA should not be viewed solely as an information gathering tool but also as a mechanism for player development (Mackenzie & Cushion, 2013; Wright et al., 2016).

While some previous research have noted variability in players engagement with performance feedback (Francis & Jones, 2014; Wright et al., 2016), our data suggest a trend toward increased alignment between coaching communication and player perceptions over time; for instance players perception on the importance of opposition puckouts according to the messaging delivered by the management increased incrementally across the 4 matchdays, beginning with a mean of 3.53 on matchday 1 and culminating in a mean of 4.4 on matchday 4. These findings suggest that in youth elite contexts, consistent messaging can help shape shared performance priorities. This extends earlier quantitative observations that some athletes become highly invested in performance analysis while others may disengage (Groom et al., 2012), by showing how such alignment can emerge over multiple matches, offering a more structured and measurable look at communication effects in team sport settings. Moreover, these results support the notion that PA when aligned with coaching communication, can enhance players' game understanding, which in this instance speaks to the core developmental aims of youth development squads.

From an applied perspective, the results highlight the importance of agreement between coaches and analysts in selecting KPIs. Although these findings are largely similar with existing sports PA research specifically around the importance of KPIs and content specific feedback (Herold et al., 2021; Lord et al., 2020), they offer novel insights into the mechanisms by which PA information is perceived by players and deployed by coaches in a youth hurling environment. The KPIs which were chosen by through the coach outlining the factors he felt were important to a talent development environment and working in collaboration with the analyst to ensure the players left this environment with a better understanding of the games and the key areas of performance

they would be focused on as they progressed. The consistent focus on puckouts and shooting suggests that both parties had a shared understanding of the performance information that aligned with their tactical approach. Previous literature has emphasised that KPIs should be chosen collaboratively and linked to the team's playing model to ensure that the information collected is meaningful and easily interpreted (Lames & McGarry, 2007; Wright et al., 2013). In the present study, this alignment appeared to support the players' understanding by providing them with clear and repeated messages about what mattered during match play.

A further practical implication concerns the evolving role of the performance analyst within match day operations. The analyst in this study contributed real time information that supported tactical decision making, which reflects recent shifts in PA practice where analysts are increasingly involved in live match scenarios rather than solely in post-match review (Sarmento et al., 2015). The presence of the analyst on the sideline provided the coaching staff with immediate updates on puckout performance and other KPIs which were used to inform the half time feedback delivered to players. This supports earlier work that highlighted the analyst's role in bridging technology and coaching by providing accessible and contextually relevant information that supports decision making (Andersen et al., 2022; Nicholls et al., 2019). The findings also align with research which emphasises the importance of effective communication between coaches and analysts (Huggan et al., 2015; Nelson et al., 2023). In this study the coach relied on the analyst's data throughout the matches which suggests a strong level of trust. This is consistent with Martin et al. (2021) who noted that analysts perceive reporting information to coaches as the most critical component of their role.

A further important aspect of the findings relates to the relationship between the coach and the analyst. Previous research has highlighted that an analyst's ability to clearly report information to coaches and players is one of the most critical elements of their role (Martin et al., 2021). In the present study the coach acted as a gatekeeper in deciding what information to pass on to players during the match and at half time. This type of gatekeeping can support communication by ensuring that messages remain focused although it also places considerable importance on the strength of the coach analyst relationship (Bampouras et al., 2012). The regular use of the analyst's data by the coach suggests that there was a high level of trust between both roles which is consistent with findings in applied settings where analysts have identified the coach analyst relationship as central to effective practice (Nelson et al.,

2023). In a developmental environment where coaches and analysts work together over an extended period of time this relationship can become even more influential as familiarity and shared experience support clearer communication and a better understanding of each other's priorities. This study therefore reinforces the idea that consistent collaboration between the coach and the analyst can enhance the integration of performance analysis within the coaching cycle.

The findings also demonstrate how PA can support learning within youth development squads. Unlike senior teams where performance outcomes often take precedence, youth environments place more focus on education, skill acquisition, and longer term development (Smith & Cushion, 2006). The repeated use of the same KPIs across matches and the clear communication from the coaching staff helped to reinforce key tactical themes for players. This consistency was evident in both winning and losing situations and likely supported the players' growing understanding of the game demands. Previous studies have suggested that PA can support learning when it prioritises understanding rather than raw metrics (Reeves & Roberts, 2013). The present study provides further evidence of this by showing how young players can begin to recognise and recall central tactical ideas when they are exposed to them consistently across multiple games.

In summary the study addressed all three aims. The first aim was met by documenting the nature and content of communication during match play and by showing how this communication aligned with player recall. The second aim was addressed through the communication tallies which highlighted how regularly coaches delivered technical, tactical, and motivational messages and how this varied across different games. The third aim was met by demonstrating that players' recall patterns were influenced by both the frequency of coaching messages and the specific context of each match. Together these findings provide evidence that PA can play a meaningful role in shaping communication, guiding tactical clarity, and supporting learning within Under-15 hurling talent development environment.

3.4.1 Limitations

While the study offers valuable insight into how performance analysis operates within an Under-15 hurling talent development environment, several limitations should be recognised when interpreting the findings. The research was conducted with a single Under 15 intercounty squad during one competitive season. This means that the

findings may reflect characteristics unique to this group, such as coaching style, team culture, or the specific developmental stage of the players. Other academy environments may differ in important ways and future research would benefit from examining multiple teams to explore whether similar patterns emerge across different settings.

The study relied on audio recordings, content analysis, and self-reported perceptions from players to understand how communication was delivered and received. Although this approach allowed for a detailed examination of match day communication, it does not capture all aspects of how players interpreted the information or how deeply it was understood. Players may have echoed what coaches emphasised without fully grasping the tactical rationale behind it. Future studies could incorporate interviews or observational follow ups to explore how players made sense of the feedback they received. The use of questionnaires also introduces the possibility of bias, particularly when players respond shortly after the game and may still be influenced by the emotions of the match.

A further limitation relates to the specific KPIs selected. These indicators were chosen in collaboration with the coaching staff and reflected the team's tactical priorities at the time. While this grounded the research in applied practice, it also meant that other important aspects of performance may not have been captured. For example, elements such as defensive structure, transition play, or off the ball movement may also influence match outcomes but were outside the scope of this study.

Another limitation relates to the inferential statistical analysis. Independent samples t tests were used to compare perceived KPI importance at two single match points, which offered a useful indication of changes across the competitive cycle but did not capture individual trajectories across all fixtures. The absence of player linked scores over multiple matches meant that more detailed longitudinal analyses, such as repeated measures models, were not appropriate. As a result, the statistical findings should be viewed as indicative rather than definitive and interpreted alongside the descriptive trends and communication tallies. Future research that collects matched player responses across all fixtures would provide a more robust statistical examination of changes in perception over time and would allow stronger claims to be made about how repeated performance messaging influences learning and understanding.

It is also important to acknowledge the dual role of the researcher as the team's

performance analyst. Although efforts were made to integrate seamlessly within normal match day routines, the presence of a researcher may have influenced how coaches communicated or how players engaged with the analysis process. This dual role also meant that the level of support available to the team, including real time data and consistent analytical input, may not represent typical practice in all youth environments, particularly in settings with limited resources.

Despite these limitations, the study provides a detailed account of how performance analysis can be embedded within a youth coaching structure and highlights several areas for further investigation. Future research may wish to explore how communication patterns develop across longer periods of time, how simplified PA methods might be used in resource limited contexts, or whether players who experience structured PA support at youth level show enhanced tactical understanding as they progress through the talent pathway.

3.5. Conclusion

In conclusion, this study provides evidence that performance analysis can play a meaningful role within an Under-15 hurling talent development environment when it is integrated consistently throughout the coaching cycle. The findings showed that coaches placed sustained emphasis on a small number of key performance indicators and that these themes were reinforced during in game communication and half time team talks. Importantly, players' perceptions of what was emphasised closely matched the messages delivered by the coaching staff which suggests that repeated and structured communication can support player understanding of tactical priorities.

The study also demonstrated the value of the performance analyst within the match day process. The analyst's real time observations helped to guide half time feedback and allowed the coaching staff to maintain clarity around the aspects of performance they considered most important. It is important to clarify the mechanism through which this value was added. The analyst's in-game communications, including the 143 pieces of communication recorded in Game 1, were directed to the lead mentor and wider coaching staff rather than to the players, with the analyst feeding any potentially significant statistical trends to the manager at the agreed fifteen minute intervals throughout play. The coach, acting as the gatekeeper, then determined which of these insights were relayed to the players. The alignment between the KPIs tracked by the analyst in real time and the content of the half time team talks provides evidence

of this process in practice, as the five KPIs monitored by the analyst accounted for the large majority of half time messaging across all four games. This was most evident in Game 4, where puckouts accounted for 80% of the half time messaging and three quarters of this concerned opposition puckouts, an area the analyst was tracking and feeding to the manager throughout the first half. It is in this filtering and shaping of the half time message, rather than through direct instruction to players, that the analyst added value to the match day process. This collaborative approach reinforces earlier work which highlighted the importance of a strong coach analyst relationship in supporting effective performance analysis. In this environment the analyst contributed to both immediate decision making and longer term player development by helping to create a consistent narrative around the team's tactical focus.

The findings highlight several implications for applied practice. Coaches and analysts working in youth environments should consider agreeing a small set of KPIs that align with their game model and using these consistently across matches and training sessions. Clear and repeated communication can help young players recognise the tactical themes that underpin their performance and can support their learning as they progress through the development pathway. Analysts may also benefit from being present during match play where possible since real time insights appear to provide valuable support to coaching decisions.

Looking ahead, there is scope for further research to explore how performance analysis can contribute to long term player development in Gaelic games. Studies that follow players across multiple seasons or examine different age groups would help to deepen understanding of how communication, analysis, and learning interact over time. There is also potential to investigate how youth teams with fewer resources can adopt simplified PA methods without compromising the educational benefits associated with structured feedback.

Overall, the study reinforces the idea that performance analysis is not only a tool for evaluating performance but also an important part of the learning environment for young athletes. When analysts and coaches work together to deliver consistent and meaningful information, performance analysis can play a central role in supporting both immediate performance and broader developmental goals.

Chapter 4: Illuminating Match-Day Communication: Performance Analysis in Elite University Gaelic Games

4.1 Introduction:

Performance Analysis (PA) has become an integral component of applied sports science, offering structured and objective insights that inform coaching, decision-making and performance optimisation (Martin et al., 2021). Early iterations of PA relied heavily on manual notational analysis (Hughes et al., 2008); however, technological advancements, particularly in video systems, wearable devices and real-time data capture, have transformed the discipline. These innovations have expanded analysts' capacity to gather, organise and interpret substantial volumes of performance information (Lord et al., 2020), driving rapid growth in PA use across both amateur and professional sport (Sarmento et al., 2015; Wright et al., 2012). As a result, the analyst has shifted from a data collector on the fringes of a backroom team to an embedded contributor within the coaching cycle, supporting tactical planning, live adjustments and post-match review (Andersen et al., 2022; Giblin et al., 2016).

Within the Gaelic Athletic Association (GAA), the increasing physical and tactical demands of Gaelic Football and Hurling have mirrored trends in professional sport (McGuigan et al., 2018). Inter-county players now prepare within highly structured environments, and tertiary competitions such as the Sigerson and Fitzgibbon Cups have intensified as many participants juggle university responsibilities alongside high-performance sport (Brown, 2016; Gamble et al., 2019). As the competitive landscape has evolved, so too has the expectation that PA delivers clear, timely and contextually relevant information to enhance coaching interventions and support player learning (Carroll, 2013).

Despite its growing prominence, the influence of PA is shaped not only by the quality of data produced but by the ways in which information is interpreted, communicated and embedded within team dynamics. Analysts must continually navigate relationships, expectations and communication pathways that determine which information is noticed, prioritised or acted upon (Bampouras et al., 2012; Huggan et al., 2015; Wright et al., 2014). Coaches often serve as intermediaries who filter or contextualise performance information before it reaches players, while players

themselves vary in their engagement with video, review sessions and KPI-based insights (Groom & Cushion, 2005; Groom et al., 2012; Francis & Jones, 2014). In fast, fluid and tactically dense games such as Hurling and Gaelic Football, the relevance of performance data can shift rapidly with momentum, opposition strategies or emotional tone (Mason et al., 2020; Mouchet et al., 2014).

Although interest in PA within GAA contexts has grown, notable gaps remain in understanding how PA functions as a communicative and relational practice during live competition. Existing research outlines analyst role perceptions (Martin et al., 2024; Wright et al., 2014), patterns of coach engagement with PA tools (Martin et al., 2017), and player preferences for feedback (Francis & Jones, 2014; Wright et al., 2016). However, these studies largely rely on retrospective accounts rather than real time observation of the communication exchanges that occur during competition. Furthermore, while code-specific performance indicators have been identified for Hurling and Football (Clear et al., 2017; McGuckin et al., 2020), there is limited empirical work exploring whether structural, temporal and tactical differences between these codes shape the communication processes through which PA information is produced, transmitted and used. This gap is particularly notable in third level competitions, where the Fitzgibbon and Sigerson Cups represent high performance environments that have received relatively little research despite their importance within the wider GAA development pathway.

Recent work by Martin et al. (2021) offers a comprehensive framework for understanding applied PA practice, illustrating how analysts navigate interpersonal and contextual complexities. Their lighthouse analogy suggests that analysis is not simply the generation of data but a process of illuminating the aspects of performance that matter most in a given moment, helping coaches and players orient themselves within the unfolding competitive landscape. The framework outlines interdependent areas of practice, including relationship building, generating performance knowledge, creating conditions for others to access and understand that knowledge, and supporting others to act on it. While this study does not apply the lighthouse model as a prescriptive analytical tool, it provides a useful lens for appreciating how communication, timing, and clarity underpin effective PA delivery. In this respect, the analogy aligns closely with the present study, which aims to reveal how particular pieces of information were emphasised at critical moments and how these illuminations shaped subsequent decision making in real time.

Understanding PA as a communicative practice also requires theoretical grounding in how information flows within complex social systems. Communication in high performance sport reflects sender–receiver processes in which analysts must distil performance data into messages that coaches and players can interpret within significant time constraints (Sullivan et al., 2014)). The effectiveness of this transmission depends not only on clarity but on shared mental models, overlapping understandings of game situations, tactical priorities and performance expectations (Ashford et al., 2023). When mental models align, communication can be concise and efficient, when they diverge, messages may be misunderstood or disregarded. In highly competitive settings, the appropriateness of a feedback type varies with the demands of the game and individual player preferences (Guzmán & Calpe-Gómez, 2012). These considerations underscore the need to examine not only what analysts communicate but how, when and under what contextual conditions.

The Fitzgibbon and Sigerson Cups offer a uniquely challenging environment in which these dynamics unfold. Many players manage demanding academic schedules alongside club and intercounty commitments, creating heightened pressure and a strong need for clarity in communication and support structures (GPA, 2024). In such settings, PA has the potential to support decision making, but only when analysts, coaches and players share an aligned understanding of which information is relevant and how it should inform action (Martin et al., 2021).

There are potentially compelling reasons to expect that PA communication processes may differ between Hurling and Gaelic Football. Hurling's faster ball speeds and rapid transitions produce narrower windows for tactical intervention (Egan et al., 2025). Differences in restart structures (puck-outs versus kick-outs), defensive shapes and attacking systems further shape the content and timing of analyst input (Falconer et al., 2025; McGuckin et al., 2020). Emerging evidence suggests differing levels of PA engagement across codes (Martin et al., 2017), although whether this translates into differences to live in-game communication remains unclear. Cultural expectations within each code may also influence how freely analysts communicate directly with players or whether information is mediated through coaching staff. These structural, tactical and cultural differences indicate that a cross-code comparison may reveal important contextual moderators of PA effectiveness.

Against this backdrop, the present study investigates the role of PA within a university's Fitzgibbon and Sigerson squads, examining how analysts and coaches

collaborate during match day performance and how players engage with and interpret PA information. It explores how communication patterns shift with match context, how priorities evolve as games unfold and how information flows before, during and after competition. Through systematic observation of live in-game communication and post-match interviews with analysts, coaches and players, the study seeks to develop a detailed, empirically grounded account of how PA is woven into the rhythm of elite third-level GAA competition and the communicative practices through which PA influences performance outcomes.

Taken together, this study offers three main contributions. First, it provides one of the few fine-grained, real-time descriptions of analyst communication within elite third level Gaelic games. Second, by comparing Hurling and Gaelic Football within a single institutional context, it highlights how code-specific structural and cultural factors could shape what analysts can say, when, and to whom. Third, by integrating communication tallies with player and staff reflections, it identifies where information flows are aligned or misaligned across the analyst–coach–player triad. These insights have implications for how PA services are designed, delivered and evaluated within Gaelic games and comparable high performance team sport environments.

4.2 Methodology

4.2.1 Study Design

The focus of this study was on matchdays for the DCU Dóchas Éireann Fitzgibbon and Sigerson Cup teams. During these games there was a performance analyst situated on the sideline with the management to provide them with live in-game analysis, in order to assist the management team in influencing the outcome of games. The Fitzgibbon cup management team was made up of the head coach, the analyst and three coaches. While, the Sigerson Cup Management Team comprised of the head coach, two analysts and four coaches. Data were collected across the 2024-25 Sigerson and Fitzgibbon Cup campaigns, encompassing five Fitzgibbon Cup matches and four Sigerson Cup matches.

The analyst was equipped with an audio recording device on matchdays to capture communications between the coaching staff and the players in-game. All audio was recorded on a SONY IC Recorder ICD PX370. Subsequently, they were used alongside player interviews to assess, players perception of the PA process compared with the actual use of it. In the immediate aftermath of each game interviews were

conducted with the analyst and an independent observer, with experience in both coaching and PA. The structure of the interview explored the perception of the analyst on the impact that they had on decision making and communication in-game. On matchdays, the independent observer would be observing both the proceedings of the game and the interactions of the analyst with the management team in order to establish relevant questions regarding the role of the analyst in the communication process and decision making on that given day. The independent researcher was able to gather their own objective view on the game and question the analyst on what input if any they had regarding aspect of the game that the independent observer felt were critical and relevant to the remit of the analyst. Through their observation they would have an idea of how much communication was conducted between the analyst and the coaching staff without being aware of the content of their discussions which prevents the formation of bias based on the outcome of the game and the information that was provided.

Before the next training session or team meeting, these interviews were aimed to be conducted within the 24-48 hours prior to the conclusion of the game however in any case where the player was unavailable to do this, the interview was conducted prior to the next training session or team meeting to prevent any bias in the players perception emanating from the training/meeting where the game would be discussed. the primary investigator interviewed a cohort of players, reflecting the cross section of players; namely a goalkeeper, defensive player and offensive player. Interviews were conducted after 4 matchdays in Championship and 5 matchdays in League across both the Sigerson and Fitzgibbon Cup. This resulted in a total of 9 interviews with each player, so 27 in total with each team. These interviews were centred on the players perceptions of the teams engagement with PA in all aspects of their preparation and performance. The interviews explored the teams use of PA in the lead up to the game, and it also explored the players awareness of in-game communication from the management team. Hence the importance of interviewing the cross section of players as it would allow us to ascertain whether certain positions received instruction better than others. These interviews were also downloaded onto a secure Google Drive and transcribed. Ethical approval was obtained through the institutional Research Ethics Committee.

4.2.2 Participants

The study was carried out using players from the DCU Sigerson Cup team and DCU Fitzgibbon Cup team. Participants comprised of three players from DCU's Fitzgibbon Cup hurling squad and three players from the Sigerson Cup football squad,

recruited through purposive sampling to ensure positional diversity: From each code, three players per match were selected representing distinct tactical roles: one goalkeeper, one defender, and one attacker. This sampling strategy was designed to capture varied perspectives on PA communication across different field positions, as prior research suggests that positional role influences both exposure to and receptivity towards coaching communication (Mason et al., 2020). Interviews were conducted in order to allow the players to expand on their opinions and also allow the interviewer to engage in conversation about their perception of PA use through the responses they provided, in line with the use of semi-structured interviews in qualitative sport and exercise research (Smith & Sparkes, 2016). All participating players were competing at elite university level, with five of the eight players interviewed also involved in inter-county programmes. Players ranged in age from 20 to 23 years (M = 22.375, SD = 0.992). Participation was voluntary, and all players provided informed consent prior to data collection.

The analysts involved are outlined in Table 1, while the management teams of both the DCU Sigerson Cup and DCU Fitzgibbon Cup team were also part of the study (see Table 4.2).

Table 4.1 Information on Analysts

Analyst	**Experience**
Fitzgibbon Cup Analyst	Has worked with multiple teams at an intercounty level, from underage to senior. Has been working as the analyst for the DCU Fitzgibbon Cup team since 2021 under multiple management teams. Has worked with current DCU Fitzgibbon Cup management for the last 2 years
Sigerson Cup Analyst	Has coached at collegiate and intercounty level with Ladies Gaelic Football. Got involved in performance analysis due to his academic degree in Sport Science. Has been working with the DCU Sigerson Cup team since 2021 under multiple management teams. This was their first season working under the current DCU Sigerson Cup management team

Table 4.2 Information on DCU Fitzgibbon & Sigerson coaches

Coach	Coaching Experience
Fitzgibbon Cup Manager	Has worked with DCU Fresher teams for numerous years before taking over as Fitzgibbon Cup manager
Sigerson Cup Manager	At the time of the study was in their first season managing the DCU Sigerson Cup team
Fitzgibbon Coach 1	Has coached at various levels up to and including inter county
Fitzgibbon Coach 2	Former inter county player. Now coaching at an underage inter county level
Fitzgibbon Coach 3	Has been involved with the DCU Fitzgibbon cup team for numerous years under a variety of different managers
Sigerson Coach 1	Has been involved in the coaching of DCU Sigerson Cup team for the past number of years under various management teams
Sigerson Coach 2	Has been involved with coaching various underage inter county teams. Has been involved with the DCU Sigerson team for a number of different years under various management teams
Sigerson Coach 3	Has been involved with the DCU Sigerson Cup team for a number of years under various different management teams. Has worked with the analyst for the last number of years with regard to presenting information to the players in analysis meetings

4.2.3 Data Collection

Three forms of data were collected

4.2.3.1 In-game Communication Audio

All pitch side communication involving the analyst and coaching staff was recorded live during matches. These recordings provided an objective log of the frequency, direction and content of communication from the analyst across match phases.

4.2.3.2 Post-match analyst and observer interviews

Conducted immediately after the game, these explored perceptions of communication effectiveness, decision-making processes and the analyst's involvement in tactical adjustments.

4.2.3.3 Player interviews

Conducted within days of each match, these sessions examined players' interpretations of PA processes, their engagement with pre-game analysis, their awareness of in-game communication and their perceptions of how information was used across the team. Interviews were conducted in order to allow the players to expand on their opinions and also allow the interviewer to engage in conversation about their perception of PA use through the responses they provided (Smith & Sparkes, 2016).

All recordings were uploaded to a secure Google Drive folder, transcribed verbatim and stored in password-protected files. Match communication logs and interview transcripts were then used to investigate how analysts and coaches engaged PA processes to inform decision-making and how players perceived the flow of information.

4.2.4 Data Analysis

The in-game communication recordings were examined using a structured categorisation process. Each verbal event captured in the audio files was coded into one of three categories: communication directed to coaches; communication directed onto the pitch to players; and general communications, which included self-talk, analyst–analyst dialogue or non-directed commentary relevant to ongoing analysis decisions. Frequencies were calculated for each category across halves and across matches, generating descriptive summaries for both the Fitzgibbon and Sigerson campaigns. These tallies were used to identify patterns in communication volume, direction and timing, and to explore differences between codes and match contexts. The quantitative summaries were then integrated with the RTA findings to support a richer interpretation of how PA communication occurred and how analysts, coaches and players understood its influence on match-day performance.

In order to fully understand the benefits and issues associated with the use of PA on matchdays we decided that interviewing players was the most effective method of data

collection as it would allow us to establish both differences and similarities experienced by players (Price et al., 2021). As previously mentioned all of these interviews were transcribed and the subsequent transcriptions were used to analyse the content of the interview through Reflective Thematic Analysis (RTA). Thematic Analysis is a commonly used method in qualitative sport and exercise research whereby key themes are identified and used to analyse the data (Braun & Clarke, 2019).

RTA was employed to analyse the qualitative data (Braun et al., 2019). I actively engaged in interpreting data through the lens of my own cultural membership, social position, and ideological commitments, as well as my scholarly knowledge (Braun et al., 2019). However, I used reflexivity to reflect openly on the data collected. Furthermore, as an 'insider' to the environment under investigation, my supervisor acted as an 'outsider' to the Gaelic Games tertiary education environment with extensive experience in another sport and as a researcher in sport. This 'insider' and 'outsider' perspective was seen as a resource in the collection and analysis of data, as without this insight there is potential for weakened theoretical sensitivity leading to reduced quality of findings (May & Perry, 2022). RTA realises that my positioned perspective allows me to provide deep contextual insight into the data and interpret the most meaningful aspects that are derived from it (Braun & Clark, 2019). My reflexivity was conducted through the use of the supervisor positioned as an outsider which strengthens my study.

A six-phase analysis process was used. Firstly, familiarisation with the data took place, this engagement was trying to draw connections between data and existing literature to allow for direction of future coding (Braun et al., 2019). Secondly, generation of codes within NVivo. The coding phase in RTA is about focused attention, to make sense of data systematically and rigorously (Braun et al., 2019). Then, in depth searching for themes within the codes took place to assist in the construction of an insightful narrative around the data, where the knowledge of my supervisor was utilised. Then there was considerable back and forth between myself and my supervisor in reviewing, defining, and naming themes before the production of the final report. Rigor and trustworthiness were addressed via 'a critical friend', where my supervisor challenged interpretation through a process of critical dialogue (Smith & McGannon, 2018). This process was not designed to achieve a consensus but encourage reflexivity~~,~~ through the exploration of alternate explanations and perspectives (Smith & McGannon, 2018). This approach is consistent with the position of reflexive thematic analysis that researcher subjectivity is a resource for knowledge generation rather than a bias to be controlled or corrected for, and that reflexive practices such as critical dialogue with a supervisor are

employed to enhance analytical rigour rather than to eliminate the researcher's perspective from the analysis (Braun & Clarke, 2019, 2022).

4.3 Findings and Discussion

These findings are presented in two parts. First, communication tallies from match-day audio recordings illustrate the volume and directional patterns of analyst communication across both squads and all matches. Second, themes generated through Reflective Thematic Analysis (RTA) integrate player, analyst and observer perspectives to provide deeper insight into how PA communication was understood and experienced across both codes.

4.3.1 Analyst Communication Tallies

Tables 4.3–4.12 present the quantitative summaries of analyst communication during each match. Communications were categorised as described above. Across all Fitzgibbon Cup matches, the analyst generated 958 communication events, with an average of 191.6 per game. The majority were directed towards coaches (51%), followed by general communications (30%) and pitch-directed messages (18%). Communication volumes tended to increase in second halves across most matches, especially in games where score margins remained narrow until late.

Table 4.3 – Fitzgibbon Cup Analysts 1st Half Communications

	Comms. To Coach	**Comms. To Pitch**	**General Comms.**	**Total**
TUS Midwest	40	2	11	53
Maynooth University	45	2	13	60
Mary I	49	33	28	110
UCC	38	7	32	77
UL	34	18	33	85
Total	206	62	117	385

Table 4.4 – Fitzgibbon Cup Analysts Half-Time Communications

	Comms. To Coach	**Comms. To Pitch**	**General Comms.**	**Total**
TUS Midwest	17	1	1	19
Maynooth University	11	0	1	12
Mary I	6	2	2	10
UCC	10	0	2	12
UL	10	1	3	14
Total	54	4	9	67

Table 4.5 – Fitzgibbon Cup Analysts 2nd Half Communications

	Comms. To Coach	**Comms. To Pitch**	**General Comms.**	**Total**
TUS Midwest	45	22	30	97
Maynooth University	42	11	23	76
Mary I	57	30	39	126
UCC	49	28	48	125
UL	36	20	26	82
Total	229	111	166	506

Table 4.6 – Fitzgibbon Cup Analysts Total Communications

	Comms. To Coach	**Comms. To Pitch**	**General Comms.**	**Total**
TUS Midwest	102	25	42	169
Maynooth University	98	13	37	148
Mary I	112	65	69	246
UCC	97	35	82	214
UL	80	39	62	181
Total	489	177	292	958

Table 4.7 - Fitzgibbon Cup Team's Analysts Total Comms.

Fitzgibbon Total	Comms. to Coach	Comms. to Pitch	General Comms.	Total
Totals	489	177	292	958
Average Per Game	97.8	35.4	58.4	191.6

In the Sigerson Cup campaign, the analyst team generated 675 communication events, averaging 168.75 per game. Unlike the Fitzgibbon pattern, Sigerson analysts had a more even distribution between coach-directed (46%), pitch-directed (28%) and general communications (27%). As with the Fitzgibbon data, communication generally increased in the second half of matches, particularly in closely contested games

Table 4.8 – Sigerson Cup Analysts 1st Half Communications

	Comms. To Coach	Comms. To Pitch	General Comms.	Total
UCD	41	21	9	71
TUS Midlands	30	7	19	56
UUJ	18	3	14	35
UCD (Final)	18	25	19	62
Total	107	56	61	224

Table 4.9 – Sigerson Cup Analysts Half-Time Communications

	Comms. To Coach	Comms. To Pitch	General Comms.	Total
UCD	12	5	5	22
TUS Midlands	21	0	7	28
UUJ	16	2	2	20
UCD (Final)	24	8	1	33
Total	73	15	15	103

Table 4.10 – Sigerson Cup Analysts 2nd Half Communications

	Comms. To Coach	Comms. To Pitch	General Comms.	Total
UCD	32	37	28	97
TUS Midlands	45	15	24	84
UUJ	20	20	21	61
UCD (Final)	31	43	32	106
Total	128	115	105	348

Table 4.11 – Sigerson Cup Analysts Total Communications

	Comms. To Coach	Comms. To Pitch	General Comms.	Total
UCD	85	63	42	190
TUS Midlands	96	22	50	168
UUJ	54	25	37	116
UCD (Final)	73	76	52	201
Total	308	186	181	675

Table 4.12 Sigerson Cup Team's Analysts Total Comms.

Sigerson Total	Comms. to Coach	Comms. to Pitch	General Comms.	Total
Totals	308	186	181	675
Average Per Game	77	37.2	45.25	168.75

Collectively, the communication tallies revealed several consistent trends across both squads. Communication intensity tended to increase as games progressed, particularly during second halves and in matches where the outcome remained finely balanced. The Fitzgibbon analyst directed a greater proportion of communication towards the coaching staff, while the Sigerson analysts demonstrated a comparatively higher level of direct interaction with players on the pitch. A further distinction emerged in the volume and nature of general communications: the Sigerson set-up, which included a second analyst, enabled more collaborative dialogue and shared interpretation of live data, whereas the Fitzgibbon analyst, working alone, relied more heavily on self-directed verbal processing. Together, these patterns provide a quantitative foundation for the thematic insights that follow, illustrating how the structure of each management team, the demands of each code and the unfolding dynamics of match context shaped the flow and direction of PA-related communication

4.3.2 Reflective Thematic Analysis Table

The thematic analysis aimed to produce a structured account of how communication was experienced by players and staff. Themes are presented below, with a thematic table outlining the key findings in Table 4.14. A thematic map illustrating the relationship between the themes and subthemes generated through the reflexive thematic analysis is presented in Figure 4.1.

Table 4.13 Thematic Table

Themes:	Subtheme:	Quotes:
Communication	In Game Communication	"I think it was at 5-2 and I heard Sigerson coach 2, Sigerson Coach 2 & eh Sigerson Coach 1 shouting in like press like we have to press" (Sigerson Player 1) "It would have came from the sideline. And we all called man on man just to try and maintain because we felt that it was he was kicking over the press a bit, and we were losing it long" (Sigerson Player 1) "Looking after the backs and stuff. So he was just making sure our communication was there, and that we were all always kind of that if the ball went up the other end of the pitch, that we're always set to go again, say, or if we were all over the place in the backs with just being pulled and dragged everywhere that he kinda put us back in shape, or he'd just shout in because we were good enough at communicating anyway, but he just made sure that them kind of key points were getting across every time" (Fitzgibbon Player 1) "I think the players definitely were driving that throughout, throughout the game to be honest with ye. Even up front the way they worked to turn over ball and winning frees that they shouldn't be winning and stuff like that" (Fitzgibbon Player 1)
	Pre Game Communication	"I was chatting to Sigerson Coach 1 before it and it was play it; If you want to move up you can but when you're playing quality like UUJ it's a bit of a risk at times" (Sigerson Player 2) "The coaches say they don't mind if someone performs that we haven't identified" The thing they don't want to happen is for us to identify someone and them to perform or have such a big influence on the game" (Sigerson Player 2)
	Problems in Communication	"The DCU management weren't allowed to cross the path of the UUJ management & I was on the UUJ side" (Sigerson Player 2) "The thing they don't want to happen is for us to identify someone and them to perform or have such a big influence on the game" (Sigerson Player 2) "I came off in the 52nd minute, maybe or 50 something minute, and I was then on the side, so I could probably see or hear a bit more what was going on. And I noticed that, like the coaches were trying to get the message on, just to play simple ball, like we played two balls and two balls that were down the line and intercepted, like when we did meet. So there was kind of a call from, I think, Sigerson Coach 1, to just get the simple ball, get the ball in hand and try to control it from" (Sigerson Player 1) "Second half, I was the opposite side, so there could be a case where I could miss some messages" (Sigerson Player 2) "I think a few lads were confused whether we're going to play with a plus one or a 3rd midfielder, because in, like, the league games we had and then, but then a lot of the challenge games we hadn't. So I don't think lads were clear. They were before the game, but like, like we were right before the game, but leading up to the game, they weren't sure whether we'd be going with three inside or what we would be setting up" (Fitzgibbon Player 2) "Fitzgibbon Coach 3 came on and told me, and player 1 something, but it wasn't actually very clear what we were told. So I think I was told to come out around like centre forward, but I think he was told similar so we weren't sure whether we were both doing the same thing or not, but then we just went back and cleared it up with him" (Fitzgibbon Player 2) "He was shouting on, we didn't hear it properly" (Fitzgibbon Player 2) "It was quite windy as well, so it was hard to hear across this sideline" (Fitzgibbon Player 2)
	Half-time Communication	"I think a half time it works very well. We kind of have a couple of minutes together and what's working, what's not working. And then, usually, then either Fitzgibbon Manager or Fitzgibbon Coach 1 will ask us what we're thinking, say, which is, which is a nice way of doing things, I think, what's working well. And then they'll either agree or disagree, and add points to what we probably missed out on, what we didn't see happening say, because they obviously a different perspective on the line. So I think that that works really well" (Fitzgibbon Player 1)
	Post-game Communication	"He just then explained the plan for, the plan for the next week. We were going to meet up on Monday, and we're going to be up on Wednesday as well" (Sigerson Player 1) "There wasn't too much, too much said in that aspect. But look, we, we knew we were better than that, and the general consensus was it probably wasn't our best performance, but we were happy to get the win" (Sigerson Player 1) "He really appreciated how we kind of played and went to war, I suppose, and worked out for each other, like, so it was great to hear off him as well. Like, you know. So that was, wasn't any tactical kind of stuff saying, but yeah" (Fitzgibbon Player 1) "I feel like directly after game is hard to review it, when it's like, just after happening, you can't properly look back on it and review it yourself" (Fitzgibbon Player 2) "Yeah, leave to sit like a few days, because it allows lads to look at it themselves and not just be reactionary straight after the game" (Fitzgibbon Player 2)

PA Age	Preparation	“We pre-game in the dressing room. We went into the meeting room, and we did kind of a bit more tactical stuff there. So we went, Sigerson Coach 1 had a all the positions up on the board, and we just went through kick outs for any lads that missed it on Monday.” (Sigerson Player 1) “We continued with our usual kind of pre-game preparation” (Sigerson Player 1) “So and then we had our document as well of key players to watch, and kind of how they set up for kick outs, etc and stuff” (Sigerson Player 1) “I wouldn't look too much into it. I look at, say, from a team wise, who they had and stuff like that. Yeah, I did like the strengths and weaknesses kind of a lot, like the players that you had, like to be fair. But I, again, I personally wouldn't read into it too much” (Fitzgibbon Player 1)
	Use of PA	“We went through our game against Sligo. So just clips what we did. Well, few work-ons and then how we're going to bring it to the next game” (Sigerson Player 2) “We had footage of that game and just identify key players, their kind of systems to play, and things like that” (Sigerson Player 1)
Engagement in PA	Pre-game Analysis	“We identified their main players" (Sigerson Player 2) “Sigerson Coach 1 had a PowerPoint up, and it was just in terms of kick outs, everyone's position and their role, essentially, um, because lads, some lads, have missed Monday. So that kind of caught everyone up, which was a good kind of thing, yeah, everyone was on the same page then” (Sigerson Player 1) “We wanted the whole full forward line, to drop out half a line and kind of force it to their full back line, and then get extra bodies out around the middle to help us win their long puckouts if they did hit it long rather than going short” (Fitzgibbon Player 2)
	Impact in Game	“A lot of it was trust the process. We knew that when we press the kick out that’s kinda where we get joy” (Sigerson Player 2) “They went through beforehand in the changing room beforehand too like, like, because of my position, and I wasn't really involved in it that much so, like, it didn't really affect me as much, but I knew what was going on” (Fitzgibbon Player 1)
	Not Fully Partaking	“I had been at the meeting, wasn’t at the actual pitch” (Sigerson Player 1) “anything that was on the pitch was covered in the meeting, like what they had been doing, but I, like, it's like, still for debate whether if lads that weren't actually on the pitch, would it have helped if they were doing the examples on the field to help, kind of with that execution” (Sigerson Player 1)
Impact of PA on Performance	Gameplan	“The whole idea of our kick outs was to make them go long, and that's exactly what they did. So our plan worked, because just the execution maybe didn't” (Sigerson Player 1) “It was all kind of pre done, as in our kick outs, like, we decided to go for, like, a kind of a full on press. So if there was anything in that sense, we already had it covered” (Sigerson Player 2)

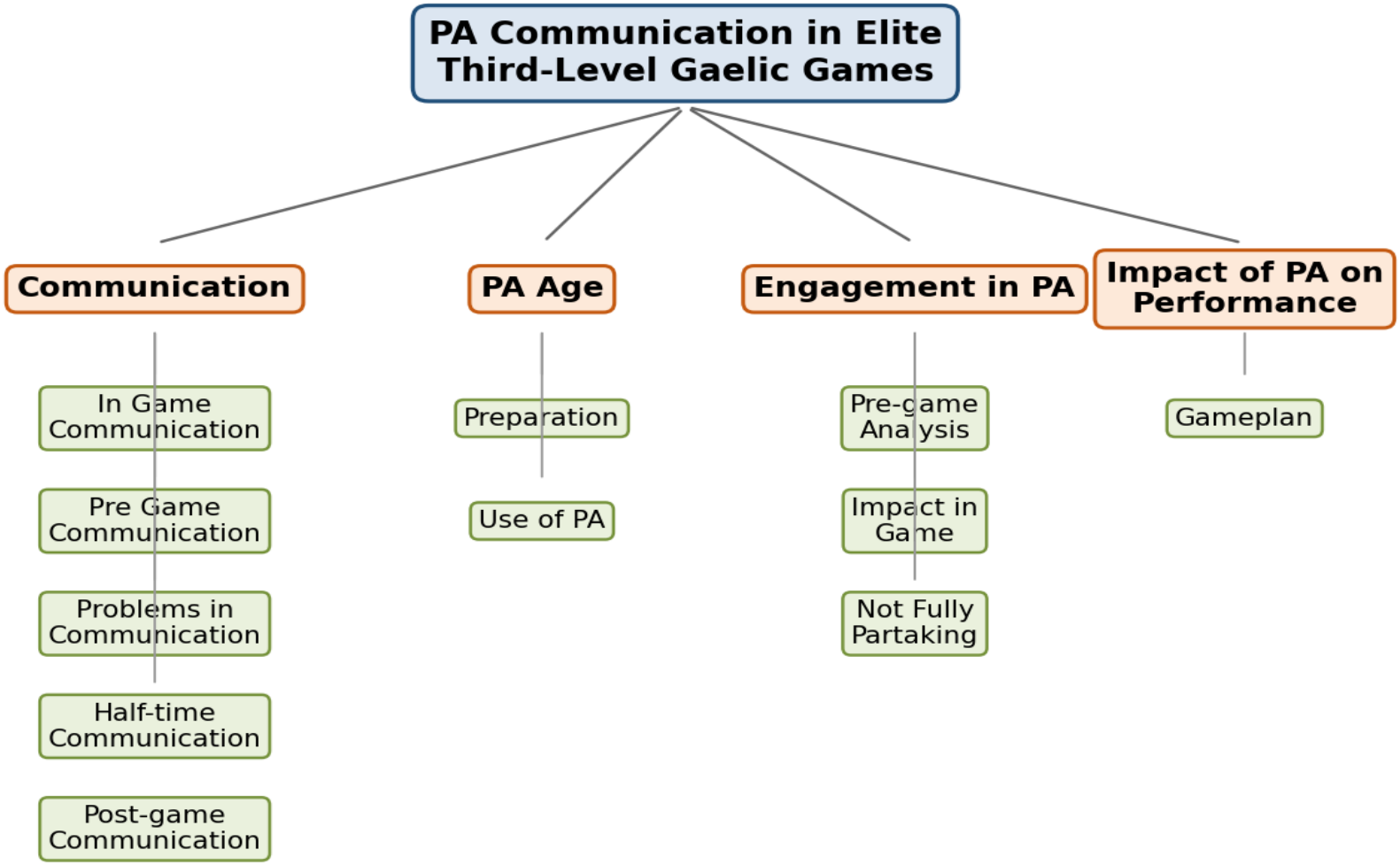


Figure 4.1 Thematic map of the themes and subthemes generated through the reflexive thematic analysis, summarising the structure of Table 4.14.

The purpose of this study was to examine how performance analysis (PA) communication unfolded in real time within elite third level Gaelic Football and Hurling environments, and how players and analysts perceived the influence of this communication on match-day performance. By integrating in-game communication tallies with interview data, the study provides a detailed account of how information flowed between analysts, coaches and players, and how this process differed across codes and match contexts. Through the analyst interviews we can also identify the instances in which the analysts felt they provided value to the team through their input which directly impacted performance.

4.3.3 The Analyst's Role Within Team Dynamics

The role the analyst plays within a certain team environment can vary depending on the dynamic of the management team and how coaches engage with analysts and the information provided by them (Wright et al., 2012). Analysts typically adapt to the environment they are situated in which tends to alter the way in which they communicate information to the coaching & playing staff (Martin, 2022). In the Sigerson team, the analyst communicated directly with players more frequently through direct engagement with the players on the pitch by shouting instructions on to the field of play (25% of interactions) compared with the Fitzgibbon analyst (18%), suggesting greater permission and confidence to influence play in real time. This aligns with research highlighting trust as central to effective analyst–coach relationships (Martin et al., 2021; Nelson et al., 2023).Where trust is strong, analysts are more likely to contribute directly to decision-making processes rather than acting solely through the coach as an intermediary.

"Press, press up on the kickout" – Sigerson Cup Analyst

This is reinforced in the literature, which suggests that analysts are most effective when they possess a deep understanding of the coach's priorities and informational needs (Bateman & Jones, 2019) This partly challenges the traditional view of the coach as the primary gatekeeper of information (Bampouras et al., 2012), indicating that gatekeeping may operate differently depending on communication structures and match demands.

The makeup of the backroom team also influenced communication patterns. The Sigerson analyst worked alongside a second analyst, enabling collaborative sense-making during matches. This accounted for a substantial proportion of what are described as general communications and appeared to reduce the frequency of coach-directed messages, as discussions between analysts allowed preliminary filtering before information reached coaches. Conversely, the Fitzgibbon analyst operated alone and demonstrated greater verbal

self-talk, reflecting individual processing rather than collaborative triangulation. Prior research suggests that clarity, alignment and shared understanding among analysts are critical when multiple analysts are present (Bateman & Jones, 2019), and these findings further highlight how staffing configurations can shape both communication patterns and analytical efficiency. The differing structures illustrate that the analyst's role is not fixed but shifts in response to team dynamics, positional responsibilities and the relational environment. The analysts' own accounts provide further insight into how they perceived their role within these team dynamics. Given that the analyst interviews were a primary data source in this study, their perspective warrants fuller representation here. These accounts, alongside the player perspectives presented above, illustrate how the analysts understood their own contribution to the match day process and how this understanding was shaped by the structures within which they operated.

4.3.4 Epistemological practice gap between hurlers and footballers

Analysis of the player interviews revealed clear differences in how footballers and hurlers engaged with performance analysis in the lead-up to games. These differences were evident in how each group described their preparation and use of opposition information. For example, footballers referred to structured, explicit pre-match briefings:

> "Sigerson Coach 1 had a PowerPoint up, and it was just in terms of kick outs, everyone's position and their role, essentially, because some lads, have missed Monday. So that kind of caught everyone up, which was a good thing, everyone was on the same page then" (Sigerson Footballer 1)

In contrast, hurlers tended to describe a more limited or selective engagement with this information:

> "I wouldn't look too much into it. I look at, say, from a team wise, who they had and stuff like that. Yeah, I did like the strengths and weaknesses kind of a lot, like the players that you had, like to be fair. But I, again, I personally wouldn't read into it too much" (Fitzgibbon Hurler 1)

These accounts suggest that the footballers on the Sigerson Cup Team were more receptive to integrating PA into their preparation, whereas the Fitzgibbon Cup hurlers engaged more variably. This reflects an epistemological practice gap, with differences not in beliefs about knowledge itself but in how each group uses, values and incorporates performance information into their decision-making. As Schommer (1998) notes, exposure and education shape individuals' willingness to adopt new information and adapt their thinking. Greater exposure

to PA from earlier developmental stages may therefore help hurlers to place more value on analytical insights and narrow this gap. This concept can be grounded in the wider literature on professional knowledge and practice. Schön (1983) distinguishes between the formal knowledge practitioners hold and the knowledge they actually draw upon in action, while Grecic and Collins (2013) describe how an individual's epistemological chain, that is their beliefs about what knowledge is and how it should be used, shapes the way they plan, make decisions and respond to feedback in sport. Within this framing, the gap observed here is not a difference in what hurlers and footballers know or believe about knowledge itself, but a difference in the epistemic norms each code has developed around the use of analysis. The tactical complexity of restart routines, the tempo of each game and the expected role of players in game planning all shape how performance information is valued and incorporated into decision-making within each sport.

Both footballers and hurlers engaged in pre-planned restart structures—kickouts in football and puckouts in Hurling—which are recognised as key tactical moments in both codes (Falconer et al., 2025). Footballers described these structures as well-established and tightly linked to their PA preparation:

> "It was all kind of pre done, as in our kick-outs, like, a kind of a full on press. So if there was anything in that sense, we already had it covered" (Sigerson Footballer 2), while the detail differed in Hurling with puck-outs,

Hurlers, by contrast, referenced puckout preparation but often with a lighter personal involvement:

> "They just went through beforehand in the changing room beforehand too like, because of my position, and I wasn't really involved in it that much so, like, it didn't really affect me as much, but I knew what was going on" (Fitzgibbon Hurler 1).

While both squads prepared restart systems, the data indicated differences in how players adapted these structures during live play. Footballers reported regularly receiving and responding to instructions mid-game:

> "for kickouts they might just be trying to get us to switch like, whether we're going zonal press or man on or mark from the outside" (Sigerson Footballer 1)

Hurlers, however, described structural adjustments being made more typically at half-time due to the pace of the game and reduced opportunity for live instruction:

> "so for the high and wide and being on the 65 as a wing back, they were saying, kind of, come back to the 45 which forces your man to be honest then and then there's more space for the half forward line as well. If they were, what they were doing was just cheating, kind of, and stepping 5-10, yards off their man, which still wasn't, wasn't allowing enough space for a wing back to be hit" (Fitzgibbon Hurler 3)

Together, these findings suggest that footballers not only receive but expect ongoing tactical cues during games, and are accustomed to integrating these cues into their actions. Hurlers, by contrast, rely more heavily on pre-arranged principles and collective understanding, with half-time emerging as the most feasible moment for substantial tactical adjustment. This places greater emphasis on player decision-making and problem-solving within play, consistent with the demands of the sport's tempo. As Price et al. (2023), the ability to process and implement information in dynamic contexts must be developed systematically in training; the findings here suggest that the two codes cultivate these skills in different ways.

4.3.5 Communication: Gaelic Football compared to Hurling

The pace at which each game is played emerged as a major factor influencing how easily players could receive and act upon live information. Gaelic Football's comparatively slower tempo provided greater opportunities for players to engage with sideline instruction. As one footballer explained:

"It's a lot easier for Sigerson Coach 1 or one of the lads to like they're nearly talking to you" (Sigerson Footballer 1).

In contrast, Fitzgibbon hurlers described the pace of Hurling as limiting the feasibility of in-game messaging, with rapid ball movement leaving little time for external cues to be processed:

> "I don't think much needed to be said from the sideline or from anyone, but we kind of knew what to do, and just it was just it was just about executing it" (Fitzgibbon Hurler 1).

These accounts suggest that the scope for coaches or analysts to influence play in real time is inherently greater in Football than in Hurling. Footballers can receive intermittent tactical prompts, such as the analyst's instruction to "shift across", during slower passages of play, whereas hurlers rely more on pre-arranged structures established before the ball enters their area. This reliance may also help explain why 51% of the Fitzgibbon analyst's interactions

were with coaching staff rather than players, possibly ensuring that collective systems were correctly organised required close coordination with coaches rather than direct intervention on the field.

Despite these differences, both codes faced practical constraints that limited communication during live competition, reinforcing the importance of pre-game preparation. Spatial restrictions and environmental factors sometimes prevented messages from being delivered or heard. One footballer recalled:

> "well for me anyways, the DCU management weren't allowed to cross the path of the UUJ and I was on the UUJ side" (Sigerson Footballer 2)

Similarly, hurlers described moments where urgent instructions were simply not heard clearly:

> "[Fitzgibbon Coach 3] came on and told me, and Fitzgibbon Player 4 something, but it wasn't actually very clear what we were told."
>
> "I don't know whether that was, just because he was shouting on, we didn't hear it properly, or whatever" (Fitzgibbon Hurler 2).

These examples highlight the inherent challenges of communication in live, competitive environments, and that these challenges cannot be fully replicated in controlled training setting (Corbett et al., 2024; Mason et al., 2020). They also underline the importance of establishing strong communication practices during training, as clarity and consistency in these environments can enhance players' ability to interpret and execute tactical intentions when in-game communication becomes constrained (Guzmán & Calpe-Gómez, 2012).

It is important to acknowledge that these comparisons are drawn from a case study of two squads within a single institution and a single season, and they should therefore be treated as exploratory and hypothesis generating rather than confirmatory. The observed differences between the codes may reflect the specific conditions of these two squads rather than inherent differences between hurling and Gaelic football. In particular, the Sigerson set-up operated with two analysts while the Fitzgibbon analyst worked alone, and this structural difference could plausibly account for some of the differences in communication volume, consistency and player familiarity with PA, alongside other potential confounding factors such as the depth of pre-match briefings and the broader coaching culture within each squad. While the Fitzgibbon analyst was more involved in the preparation of match briefings than the Sigerson analysts, which suggests that preparation alone does not explain the observed differences, the staffing difference itself cannot be ruled out as a contributing factor. The diversity of counties represented across both panels provides some reassurance that the findings are not tied to a

single playing background, however future research across multiple institutions and seasons is required before these differences can be attributed to the codes themselves.

4.3.6 Impact of match context on communication

The findings also showed that communication patterns varied considerably depending on the flow and context of the game. The role of the analyst is to try accommodate the coach as best they can by attaining as much information as possible in the event that the coach seeks that information (Mulvenna et al., 2024). Analysts were continually required to judge not only what information to share but also when it was most tactically valuable. While analysts monitored multiple performance indicators throughout each match, they did not automatically pass all information to coaches. Instead, in line with reported best practice, they exercised discretion, prioritising insights they felt were objective, actionable and contextually relevant (Martin et al., 2021). This was illustrated in the Sigerson Cup semi-final, where the analyst communicated far less frequently (35 times). during the first half. Reflecting on this period, he noted:

> "It's all just subjective in my point of view" (Sigerson Analyst).

This comment suggests that, in the absence of clear patterns or reliable trends, the analyst withheld information rather than risk overloading coaches with observations grounded more in perception than objective evidence. Such behaviour aligns with research indicating that effective PA requires discernment, not volume, and that analysts must balance data collection with judgements about relevance and timing (Martin et al., 2021).

Analysts also described their role as providing problem identification rather than prescribing solutions. One Fitzgibbon analyst explained:

> "a lot of what I'd be given will be a problem, semi solution, and then we either go, yeah, we'll do it, or not" (Fitzgibbon Analyst in interview with independent observer).

This division of labour reflects established coaching dynamics in which analysts highlight emerging trends while coaches determine how best to translate these insights into tactical action (Bateman & Jones, 2019). Analysts therefore play a supporting role that is both responsive and contextually sensitive. Their communication intensifies when meaningful patterns emerge and diminishes when game flow offers no clear tactical leverage.

The communication tallies further revealed that both teams showed an overall increase in messaging during the second half of matches. This occurred in 9 of the 12 Fitzgibbon tallies (75%) and 10 of the 12 Sigerson tallies (83%), indicating that analysts became more active as matches progressed. These increases were typically observed in tightly contested games where

outcomes remained uncertain, conditions that prior research suggests heighten the demand for timely, targeted communication (Calpe et al., 2013; Mason et al., 2020). Given that most matches analysed in this study were decided by narrow margins, it is likely that the escalating communication reflected efforts to influence play during critical phases.

Overall, these findings show that analyst communication is closely tied to match dynamics, with analysts adjusting their involvement based on the clarity of emerging trends and the perceived potential of their input to affect performance. Communication is therefore not a constant stream but a situationally responsive practice shaped by the rhythm of competition.

Taken together, the findings illustrate that performance analysis communication in elite third-level Gaelic Games is shaped by a complex interplay of relational, structural and contextual factors. The analyst's influence depended not only on the quality of their insights but on the trust established within the management team and the degree to which their role was integrated into decision-making processes. Clear differences emerged between codes, with footballers demonstrating more consistent engagement with structured information and they were more accustomed to incorporating live tactical cues, whereas hurlers relied more heavily on pre-arranged principles due to the pace and continuous nature of their game. Communication was further constrained by environmental and organisational factors, reinforcing the importance of shared understandings developed through training. Finally, communication patterns were highly sensitive to match context, with analysts increasing their input during critical phases when tactical leverage was greatest. Overall, the Discussion highlights PA as an inherently communicative and situational practice, shaped as much by interpersonal dynamics and game tempo as by the data itself.

4.4 Conclusion

This study provides one of the first detailed examinations of live performance analysis (PA) communication within elite third level Gaelic Games, integrating direct in-game observations with the perspectives of analysts, coaches and players across both Hurling and Gaelic Football. By combining communication tallies with reflective thematic analysis, the study offers an empirically grounded account of how PA is enacted in real competitive environments and how information flows through the analyst–coach–player triad.

The findings demonstrate that PA operates as a fundamentally relational and context dependent practice. Analysts shaped their communication according to the trust placed in them, the structure of the coaching team and the unfolding dynamics of match play. Differences

between codes were also evident, showing footballers engaged more consistently with structured tactical information and integrated live cues more readily, while hurlers relied more heavily on pre-game preparation and half-time recalibration, potentially due to the speed and continuous nature of their sport. Match context further moderated communication patterns, with analyst input increasing during periods where the game state remained contested and decreasing when the informational value of live data was limited. Collectively, these findings highlight the importance of clarity, shared understanding and situational awareness in determining the effectiveness of PA during competition.

The study expands current knowledge in three main ways. First, it moves beyond retrospective accounts of PA to document communication as it occurs in real time, which provides a significant methodological contribution to the field. Second, it provides rare insight into PA within university GAA environments, which remain under represented in the literature despite their importance to player development. Third, by comparing Hurling and Gaelic Football, the study identifies code specific communication patterns that reflect deeper differences in information use, performance tempo and tactical structure. These contributions provide a more nuanced understanding of how PA supports coaching and decision-making within dynamic, high pressure environments.

Several limitations should be acknowledged. The study examined only one university's teams, and communication practices may differ across other institutions or competitive levels. The presence of recording equipment may also have influenced natural behaviour, although both analysts and coaches reported that they quickly became accustomed to it. Finally, while the communication tallies provided valuable descriptive insight, future research would benefit from more fine-grained categorisation of message type, tone or tactical function.

Future work should explore how PA communication evolves across a season, how shared mental models between analysts and coaches are developed and maintained, and how players' information-processing preferences can be better accommodated within training and match preparation. Cross-code comparisons should also be expanded to examine whether the differences identified here reflect broader cultural norms within Gaelic Games or team-specific practices. As PA continues to grow across both Hurling and Football, understanding not just what information is provided but how, when and why it is communicated will be central to enhancing its impact on performance.

In sum, this study demonstrates that PA is not simply a process of generating data but one of navigating people, context and the dynamics of competition. Effective analysis depends on relationships, timing and the ability to illuminate the aspects of performance that matter

most at critical moments. By foregrounding these communicative dimensions, the present work contributes to a more complete understanding of PA practice and provides a foundation for strengthening the analyst's role within elite tertiary Gaelic Games.

Chapter 5: Discussion

5.1 Introduction

The purpose of this chapter is to draw together the findings from both empirical studies and to consider what they mean for performance analysis practice and research within Gaelic games. The earlier chapters examined real time communication, half time feedback, and player recall within an elite Under 15 hurling environment and then extended this work to a third level hurling and football context. This final chapter integrates these findings and considers how they contribute to the existing literature, along with outlining the applied implications, methodological reflections, limitations, and directions for future research.

Performance analysis has developed into a central part of the coaching cycle within sport and the present research explored how communication and performance messages were delivered, interpreted, and recalled in applied hurling and football environments. By studying two distinct settings within the Gaelic games pathway this thesis provides a more complete view of how performance analysis operates as part of both youth development and collegiate performance structures.

5.2 Key Findings

5.2.1 Communication Patterns Across Both Settings

Across both the youth and third level environments the findings demonstrated a clear preference among coaches for instructional communication. Coaches delivered a steady stream of technical and tactical messages during match play with instructional comments forming the largest category of communication in each game. This reflects earlier work which identified instructional feedback as a dominant form of coach communication in invasion games (Mason et al., 2020; Mouchet et al., 2014). The present study adds to this by showing how these patterns hold in both developmental and adult amateur contexts within Gaelic games.

The Under 15 findings showed that communication intensity varied with match status. There was an increase in communication volume during periods of pressure or when the team was behind which mirrors earlier observations that coaches adjust tone and content in response to game demands (Calpe et al., 2013). A similar trend appeared within the third level environment although this setting displayed a more measured communication style. The university players received less emotionally charged instruction and coaches appeared more selective regarding when they intervened. This suggests that age, experience, and tactical maturity influence how coaches choose to communicate during games. While the communication was more measured in the third level setting that is due to the tactical nuances of the game with the coaching staff ensuring that they maximise the impact from their messaging in order to impact the outcome of the game. At u15 level we can see from the perception of

the players on the messaging being delivered that the coaching staff stayed consistent in their messaging and focused on the key development areas that had been identified and established with the analyst which shows how outcomes in talent development setting are not the priority and rather they will continue to focus on player development, aligned with the findings from (Morley et al., 2014).

5.2.2 Alignment Between Coach Messaging and Player Perception

A major finding of the study was the alignment between the emphasis placed on particular key performance indicators by coaches and the importance assigned to these indicators by players. In the Under 15 environment players consistently ranked the same KPIs as most important that were emphasised by coaching staff during match play and half time. This alignment strengthened across the four match days, particularly in relation to opposition puckouts. The repeated emphasis on this KPI from the coaching group shaped what players paid attention to which supports research on the role of consistent feedback in helping young athletes interpret performance information (Johnson-Kozlow et al., 2006; Partington et al., 2014).

In the third level environment a similar pattern was evident although players appeared to engage more independently with the performance information. They demonstrated a broader understanding of tactical aims which likely reflects the difference in playing experience and cognitive maturity between the two settings. However both groups showed that clear and repeated emphasis on specific performance indicators supports shared understanding within teams and improved clarity on their shared mental model. This highlights the value of coherent communication within the PA process.

5.2.3 Role and Positioning of the Performance Analyst

The findings across both studies underline the importance of the performance analyst within the coaching cycle. In each setting the analyst operated as a central support figure who provided objective information that helped coaches interpret the game. Coaches regularly consulted the analyst during matches and integrated the data into their half time messaging which reflects earlier research identifying reporting clarity as a primary function of the analyst (Martin et al., 2021; Wright et al., 2013). The KPIs were clearly defined and valued by both the coaching staff and the analyst and this played a vital role in keeping structure on the information being shared with the coaching staff and shaped their subsequent communication with the players (Barker-Ruchti, 2021).

The relationship between coach and analyst shaped the flow of information. Coaches acted as gatekeepers, selecting which messages reached players. This is consistent with research that highlights the power dynamics within applied PA environments (Bampouras et al., 2012; Huggan et al., 2015). The present findings demonstrate that when trust is present the analyst can influence match day communication and contribute to tactical decision making in real time. This was evident in both the

youth and third level environments although the more experienced players at third level appeared to receive and process information more readily. The thesis therefore supports the view that performance analysts must be skilled communicators with a good understanding of the tactical and relational aspects of sport (Nicholls et al., 2019).

5.2.4 Influence of Game Context on Communication and Analysis

Both studies reinforced the value of considering game context when interpreting coach communication. Match status shaped both the volume and the tone of communication. When a team was ahead communication tended to be more positive and supportive, whereas when behind it often became more directive and urgent. This corresponds with previous research in coaching science and supports the idea that communication is situational and influenced by emotional and tactical pressures (Mason et al., 2020). Due to the close nature of the outcomes of these games the increase in levels of communication as the games drew to a climax was to be expected as in tight games the communication of the coach tends to increase in order to try influence the outcome of the contest however in games where they feel like the outcome of the contest can not be impacted they are less likely to engage in issuing instructions to the players (Calpe et al., 2013).

In the Under 15 setting the influence of context was particularly evident in relation to sixty forty balls. These were emphasised more in games the team lost and players perceived them to be of greater importance under those circumstances. This suggests that youth players respond to coaches' shifts in emphasis and that their interpretation of the game is shaped heavily by what is stressed in moments of pressure. It is also the area of the game which would be least established with puck-outs and shot selection being well established areas even in literature (Clear et al., 2017; Falconer et al., 2025.; O'Brien et al., 2021), however this shows that as time progressed the player's cognitive ability to recognise different aspects of the game had developed. The third level environment displayed similar contextual patterns although the reactions appeared less variable which may reflect their greater playing experience.

5.3 Contribution to Existing Literature

5.3.1 Performance Analysis in Gaelic Games

The findings contribute directly to the limited body of performance analysis literature within Gaelic games. Research in hurling and football has identified KPIs linked to success such as puckouts and shooting efficiency (Clear et al., 2017; O'Brien et al., 2021). (Falconer et al., 2025). The present thesis extends this literature by showing not only how these indicators relate to performance but also how they are communicated and perceived within applied environments. We can establish through our

research that the analyst in a GAA environment is usually observing the actions of the game in line with the KPIs identified amongst the coaching staff. They communicate this information with the coaching staff who decide how this information is dispersed amongst the playing group in order to maximise its impact in real time. Communication is central to the role of the analyst and ensuring that the messages delivered are clear, concise and relevant to the Shared Mental Model the team has. As the game progressed and the stakes heightened with the outcome of the game becoming clearer the analyst offered more instruction directly onto the field of play from the sideline which highlights how important it is for the analyst to be integrated into the game model the coach has developed for the players. Few studies have examined how KPIs are operationalised within the coach analyst player system and the present findings provide new insight into how they structure the coaching process.

5.3.2 Communication and Feedback Within Applied PA

The findings also add to the literature on communication and feedback in sport. While much existing work focuses on training contexts the present studies provide detailed examples of communication during match play and show how players interpret performance messages. This contributes to the growing recognition that performance analysis is a communicative process that requires clarity, trust, and a shared understanding between coaches and analysts (Mackenzie & Cushion, 2013; Wright et al., 2016). The detailed mapping of communication patterns through real time audio capture represents a valuable addition to the field.

5.3.3 The Analyst Coach Player Relationship

The thesis supports and extends work on the relational dimension of performance analysis. Earlier literature has highlighted the importance of trust and mutual respect for effective analyst coach collaboration (Nelson et al., 2023; Huggan et al., 2015). The present findings illustrate how these dynamics operate in two different applied settings and demonstrate that strong relationships allow analysts to influence communication more directly. This adds practical insight to the conceptual work on analyst identity and practice

5.4 Implications for Practice

5.4.1 Implications for Coaches

The findings suggest that coaches should identify a small number of clear KPIs that them to measure and monitor their game model and communicate this consistently across training and match play. Consistent messaging helps players interpret performance information and supports collective

understanding (Wright et al., 2016). Coaches should also consider the timing and volume of in game communication and ensure that messages are concise and relevant to the immediate situation.

Coaches at a talent development level can lean on the use of consistent and clear KPIs to enhance the learning of their players. We can see that when the messages being delivered from the coaching staff are supported with data from the analyst that the players are more receptive to the information (Herold et al., 2021) and it enhances their understanding of the game which in turn should provide the coach with a stronger platform to get his desired message across to the players.

5.4.2 Implications for Performance Analysts

Analysts should view their role as extending beyond data collection. Their communication skills and relationships with coaches and players are central to their effectiveness (Martin et al., 2021). Providing timely, clear, and context aware information can shape tactical adjustments in real time (Nicholls et al., 2019). Embedding analysts within match day and training routines supports cohesion within the coaching cycle.

Analysts role is adjustable to the environment in which they are placed, even if the data they are collecting is of a similar level. Analysts are able to provide a purpose to both development and performance teams through clear and consistent KPIs that they develop as the year progresses. Their preparation of teams through these shared models such as kick-outs and puck-outs allows players to be more receptive to nuanced messaging being delivered to them in-game.

5.4.3 Implications for Youth Development Squads

Youth athletes benefit from repeated exposure to clearly defined performance messages. Analysts and coaches should avoid overwhelming young players with excessive detail and instead focus on a small number of shared models that support tactical learning (Partington et al., 2014). Opportunities should be provided for players to reflect on performance information to strengthen recall and understanding in order to aid future performance (Niforatos et al., 2018). We can see from our research that the cognitive ability of the players was developed which improves them from a tactical perspective through these shared mental models as well as developing their talents from a technical perspective (Ashford et al., 2023). The players in the talent development squad saw their understanding of the game of hurling increase due to the presence of an analyst on the coaching staff and should better prepare them for the transition into performance focused squads (Barlow et al., 2024), where the primary objective of those teams is to attain positive results.

5.4.4 Implications for Third Level and Adult Amateur Environments

Players at this level appear more capable of integrating complex tactical messages. Analysts and coaches may therefore use a broader range of indicators and can involve players more actively in the analysis process. The more stable and structured environment in third level sport provides opportunity for developing advanced tactical awareness.

5.5 Methodological Reflections

The use of real time audio capture allowed for a detailed and authentic account of communication within competitive environments. This provided insight that would not be possible through post-match analysis alone. The mixed methods design enabled triangulation between communication patterns, half time messaging, and player perceptions.

The insider role created access to communication moments that would not typically be observable to external researchers. The familiarity between the analyst and coaching staff enabled uninterrupted recording of communication, integration into strategy discussions and authentic representation of processes that reflect real-world performance environments. At the same time, this positioning means that the analytical framework was not purely observational. The KPIs examined and the nature of match-day messaging were partly informed by analyst involvement which should be acknowledged as a co-constructed methodological feature rather than a neutral observation.

5.6 Limitations and Future Directions

The research was conducted with one Under 15 hurling squad and within one third level institution so the findings may not generalise to all Gaelic games environments. The use of self-report questionnaires among youth players introduces the possibility of recall bias and the responses may have been influenced by what players believed coaches emphasised. Audio capture was limited to the sideline and may not have recorded all communication from mentors or other staff. The presence of the researcher as performance analyst may also have influenced interactions although every effort was made to minimise disruption.

The insider positioning of the researcher strengthened access to authentic communication and facilitated trust in the analytical process, yet it also shaped the data being produced. Because key messages were influenced by analyst reporting, some emphasis patterns reflected both natural team priorities and those reinforced through researcher involvement. Players recall may therefore represent both genuine understanding and the outcome of repeated analytical emphasis. Future research could compare embedded and non embedded analysts or include independent observers to better isolate these effects.

Future research could examine communication across a larger number of teams to explore whether similar patterns appear in different contexts. There is scope to track communication and player

recall across a full season or to compare teams with and without embedded analysts. Further work could also explore communication within female squads, different age groups, and across the broader Gaelic games pathway. Examining how players act on performance messages during match play would also be a valuable extension of this research.

Since the research was conducted the Football Review Committee (FRC) led by Jim Gavin has implemented wide-scale changes to the rule of Gaelic Football. The conditions under which our research was collected has vastly changed with the pace and tempo of Gaelic Football increasing due to these new rule changes. Further research into how these changes impact Gaelic Footballers ability to process a message in-game should be examined

5.7 Conclusion

This thesis set out to examine how performance analysis communication operates within two applied Gaelic games environments and how players interpret and recall the messages delivered to them. Across both studies it was evident that performance analysis plays a central role within the coaching cycle and that communication is shaped by context, tactical priorities, and the relationship between coaches and analysts. Youth and collegiate athletes responded to performance messages in ways that reflected the emphasis placed on particular KPIs by the coaching staff. The findings highlight the importance of consistent and coherent communication within performance analysis and demonstrate that analysts contribute most effectively when they are embedded within the coaching environment and supported by strong working relationships.

Overall, this research contributes to a deeper understanding of performance analysis as a communicative and relational practice within hurling and football and provides applied insights that can support coaches and analysts in helping players develop tactical understanding and enhance performance.

Bibliography

Andersen, L. W., Francis, J. W., & Bateman, M. (2022). Danish association football coaches' perception of performance analysis. *International Journal of Performance Analysis in Sport*, *22*(1), 149–173. https://doi.org/10.1080/24748668.2021.2012040

Bampouras, M. T., Cronin, C., & Miller, K. P. (2012). Performance analytic processes in elite sport practice: An exploratory investigation of the perspectives of a sport scientist, coach and athlete. *International Journal of Performance Analysis in Sport*, *12*(2), 468–483. https://doi.org/10.1080/24748668.2012.11868611

Barker-Ruchti, N. (2021). Don't buy a pig in a poke: Considering challenges of and problems with performance analysis technologies in Swedish men's elite football. *Performance Enhancement & Health*, *9*(1), 100191. https://doi.org/10.1016/j.peh.2021.100191

Barlow, L., Partington, M., Doncaster, G., O'Gorman, J., & Nelson, L. (2024). The strategic delivery of video-based coaching: A season-long investigation in one English youth soccer academy. *International Journal of Sports Science & Coaching*, 17479541241256492. https://doi.org/10.1177/17479541241256492

Bateman, M., & Jones, G. (2019a). Strategies for Maintaining the Coach–Analyst Relationship Within Professional Football Utilizing the COMPASS Model: The Performance Analyst's Perspective. *Frontiers in Psychology*, *10*. https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2019.02064

Bateman, M., & Jones, G. (2019b). Strategies for Maintaining the Coach–Analyst Relationship Within Professional Football Utilizing the COMPASS Model: The Performance Analyst's Perspective. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.02064

Braun, V., & and Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, *11*(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806

Brown, G. (2016). Comparing Gaelic Football to the Determinants of Winning Performance in Australian Rules Football at Unit-Level. *Preprints*. https://doi.org/10.20944/preprints201608.0116.v1

Brümmer, K. (2019). Coordination in sports teams – ethnographic insights into practices of video analysis in football. *European Journal for Sport and Society*, *16*(1), 27–43. https://doi.org/10.1080/16138171.2019.1603682

Calpe, V., Guzmán, J., & Grijalbo, C. (2013). Relationship between score and coaches' verbal behaviour. *Journal of Human Sport and Exercise*, *8*(Proc3), 728–737. https://doi.org/10.4100/jhse.2013.8.Proc3.19

Carling, C., Williams, A. M., & Reilly, T. (2007). *Handbook of Soccer Match Analysis: A Systematic Approach to Improving Performance*. Routledge. https://doi.org/10.4324/9780203448625

Carroll, R. (2013). Team Performance Indicators in Gaelic Football and Opposition Effects. *International Journal of Performance Analysis in Sport*, *13*(3), 703–715. https://doi.org/10.1080/24748668.2013.11868682

Clear, C., Hughes, M., & Martin, D. (2017). Attacking profiles in elite hurling. *International Journal of Performance Analysis in Sport*, *17*(3), 319–333. https://doi.org/10.1080/24748668.2017.1338074

Content.pdf. (n.d.). Retrieved February 26, 2025, from https://cora.ucc.ie/server/api/core/bitstreams/69018fc8-0613-4c4d-b886-033a099c42cb/content

Corbett, R., Partington, M., Ryan, L., & Cope, E. (2024a). A systematic review of coach augmented verbal feedback during practice and competition in team sports. *International Journal of Sports Science & Coaching*, *19*(2), 864–881. https://doi.org/10.1177/17479541231218665

Corbett, R., Partington, M., Ryan, L., & Cope, E. (2024b). A systematic review of coach augmented verbal feedback during practice and competition in team sports. *International Journal of Sports Science & Coaching*, *19*(2), 864–881. https://doi.org/10.1177/17479541231218665

Eaves, J. S. (2015). A history of sports notational analysis: A journey into the nineteenth century. *International Journal of Performance Analysis in Sport*, *15*(3), 1160–1176. https://doi.org/10.1080/24748668.2015.11868859

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*(1), 107–115. https://doi.org/10.1111/j.1365-2648.2007.04569.x

Espevik, R., Johnsen, B. H., & Eid, J. (2011). Communication and Performance in Co-Located and Distributed Teams: An Issue of Shared Mental Models of Team Members? *Military Psychology*, *23*(6), 616–638. https://doi.org/10.1080/08995605.2011.616792

Falconer, T., Earle, D., Bradley, J., & Clear, C. (n.d.). Patterns and factors determining puckout success in senior inter-county hurling. *International Journal of Performance Analysis in Sport*, *0*(0), 1–17. https://doi.org/10.1080/24748668.2025.2583568

Ford, P. R., Yates ,Ian, & and Williams, A. M. (2010). An analysis of practice activities and instructional behaviours used by youth soccer coaches during practice: Exploring the link between science and application. *Journal of Sports Sciences*, *28*(5), 483–495. https://doi.org/10.1080/02640410903582750

Francis, J., & Jones, G. (2014). Elite Rugby Union Players Perceptions of Performance Analysis. *International Journal of Performance Analysis in Sport*, *14*(1), 188–207. https://doi.org/10.1080/24748668.2014.11868714

Francis, J. W., Kyte, J., & Bateman, M. (2024). The role of the analyst: Comparative analysis of applied performance analyst job advertisements in the UK and Ireland (2021-2022). *International Journal of Performance Analysis in Sport*, *24*(4), 331–360. https://doi.org/10.1080/24748668.2023.2299178

FULLTEXT01.pdf. (n.d.). Retrieved February 26, 2025, from https://www.diva-portal.org/smash/get/diva2:421346/FULLTEXT01.pdf

Gamble, D., Bradley, J., McCarren, A., & Moyna, N. M. (2019). Team performance indicators which differentiate between winning and losing in elite Gaelic football. *International Journal of*

Performance Analysis in Sport, *19*(4), 478–490. https://doi.org/10.1080/24748668.2019.1621674

Giblin, G., Tor, E., & Parrington, L. (2016). The impact of technology on elite sports performance. *Sensoria: A Journal of Mind, Brain & Culture*, *12*. https://doi.org/10.7790/sa.v12i2.436

Goldkuhl, G. (2012). Pragmatism *vs* interpretivism in qualitative information systems research. *European Journal of Information Systems*, *21*(2), 135–146. https://doi.org/10.1057/ejis.2011.54

Gómez-Ruano, M. A. (2018). Current approaches to performance analysis in team sports. [Enfoques actuales para el análisis de rendimiento en deportes de equipo]. *RICYDE. Revista Internacional de Ciencias Del Deporte*, *14*(51), 3–4. https://doi.org/10.5232/ricyde2018.051ed

Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, *24*(2), 105–112. https://doi.org/10.1016/j.nedt.2003.10.001

Greene, M. (2014). On the Inside Looking In: Methodological Insights and Challenges in Conducting Qualitative Insider Research. *The Qualitative Report*. https://doi.org/10.46743/2160-3715/2014.1106

Groom, R., Cushion, C. J., & Nelson, L. J. (2012). Analysing coach–athlete 'talk in interaction' within the delivery of video-based performance feedback in elite youth soccer. *Qualitative Research in Sport, Exercise and Health*, *4*(3), 439–458. https://doi.org/10.1080/2159676X.2012.693525

Guzmán, J. F., & Calpe-Gómez, V. (2012). Preliminary study of coach verbal behaviour according to game actions. *Journal of Human Sport and Exercise*, *7*(2), 376–382. https://doi.org/10.4100/jhse.2012.72.04

Harsha Vardhan Goud, P. S., Mohana Roopa, Y., & Padmaja, B. (2019). Player Performance Analysis in Sports: With Fusion of Machine Learning and Wearable Technology. *2019 3rd*

International Conference on Computing Methodologies and Communication (ICCMC), 600–603. https://doi.org/10.1109/ICCMC.2019.8819815

Herold, M., Kempe, M., Bauer, P., & Meyer, T. (2021). Attacking Key Performance Indicators in Soccer: Current Practice and Perceptions from the Elite to Youth Academy Level. *Journal of Sports Science & Medicine*, *20*(1), 158–169. https://doi.org/10.52082/jssm.2021.158

How do high-level youth soccer players approach and solve game problems? The role of strategic understanding. (n.d.). Retrieved January 3, 2024, from https://www.tandfonline.com/doi/epdf/10.1080/17408989.2021.1967307?needAccess=true

Huggan, R., Nelson, L., & Potrac, P. (2015). Developing micropolitical literacy in professional soccer: A performance analyst's tale. *Qualitative Research in Sport, Exercise and Health*, *7*(4), 504–520. https://doi.org/10.1080/2159676X.2014.949832

Hughes, Hughes, & Behan, H. (2008). The evolution of computerised notational analysis through the example of racket sports. *The Korean Journal of Measurement and Evaluation in Physical Education and Sports Science*, *10*(3), 1–39. https://doi.org/10.21797/KSME.2008.10.3.001

Hughes, M. D., & Bartlett, R. M. (2002). The use of performance indicators in performance analysis. *Journal of Sports Sciences*, *20*(10), 739–754. https://doi.org/10.1080/026404102320675602

Hughes, M., & Franks, I. M. (2004). *Notational Analysis of Sport: Systems for Better Coaching and Performance in Sport*. Psychology Press.

Johnson-Kozlow, M., Matt, G. E., & Rock, C. L. (2006). Recall Strategies Used by Respondents to Complete a Food Frequency Questionnaire: An Exploratory Study. *Journal of the American Dietetic Association*, *106*(3), 430–433. https://doi.org/10.1016/j.jada.2005.12.007

Jones, D., Rands, S., & Butterworth, A. D. (2020, July 4). *The use and perceived value of telestration tools in elite football*. https://www.tandfonline.com/doi/epdf/10.1080/24748668.2020.1753965?needAccess=true

Kaushik, V., Walsh, C. A., Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a Research Paradigm and Its Implications for Social Work Research. *Social Sciences*, *8*(9). https://doi.org/10.3390/socsci8090255

Kojman, Y., Beeching, K., Gomez, M.-A., Parmar, N., & Nicholls, S. B. (2022). The role of debriefing in enhancing learning and development in professional boxing. *International Journal of Performance Analysis in Sport*, *22*(2), 250–260. https://doi.org/10.1080/24748668.2022.2042640

Lames, M., & McGarry, T. (2007). On the search for reliable performance indicators in game sports. *International Journal of Performance Analysis in Sport*, *7*(1), 62–79. https://doi.org/10.1080/24748668.2007.11868388

Lord, F., Pyne, D. B., Welvaert, M., & Mara, J. K. (2020). Methods of performance analysis in team invasion sports: A systematic review. *Journal of Sports Sciences*, *38*(20), 2338–2349. https://doi.org/10.1080/02640414.2020.1785185

Mackenzie, R., & Cushion, C. (2013). Performance analysis in football: A critical review and implications for future research. *Journal of Sports Sciences*, *31*(6), 639–676. https://doi.org/10.1080/02640414.2012.746720

Martin, D. (2022). *An investigation of professional practice and practitioner development in applied sports performance analysis* [University College Dublin. School of Public Health, Physiotherapy and Sports Science]. http://hdl.handle.net/10197/13263

Martin, D., O Donoghue, P. G., Bradley, J., & McGrath, D. (2021). Developing a framework for professional practice in applied performance analysis. *International Journal of Performance Analysis in Sport*, *21*(6), 845–888. https://doi.org/10.1080/24748668.2021.1951490

Martin, D., O'Donoghue, P. G., Bradley, J., Robertson, S., & McGrath, D. (2024). Identifying the characteristics, constraints, and enablers to creating value in applied performance analysis. *International Journal of Sports Science & Coaching*, *19*(2), 832–846. https://doi.org/10.1177/17479541231180243

Martin, D., Swanton, A., McGrath, D., & Bradley, J. (2017a). The use, integration and value of performance analysis to GAA coaches. *Journal of Human Sport and Exercise*, *12*(Proc2). https://doi.org/10.14198/jhse.2017.12.Proc2.02

Martin, D., Swanton, A., McGrath, D., & Bradley, J. (2017b). The use, integration and value of performance analysis to GAA coaches. *Journal of Human Sport and Exercise*, *12*(Proc2). https://doi.org/10.14198/jhse.2017.12.Proc2.02

Mason, R. J., Farrow, D., & Hattie, J. A. (2020). An analysis of in-game feedback provided by coaches in an Australian Football League competition. *Physical Education and Sport Pedagogy*, *25*(5), 464–477. https://doi.org/10.1080/17408989.2020.1734555

McGuckin, B., Bradley ,Jonathan, Hughes ,Mike, O'Donoghue ,Peter, & and Martin, D. (2020). Determinants of successful possession in elite Gaelic football. *International Journal of Performance Analysis in Sport*, *20*(3), 420–431. https://doi.org/10.1080/24748668.2020.1758433

McGuigan, K., Hughes, M., & Martin, D. (2018). Performance indicators in club level Gaelic football. *International Journal of Performance Analysis in Sport*, *18*(5), 780–795. https://doi.org/10.1080/24748668.2018.1517291

McLean, S., Salmon, P. M., Gorman, A. D., Read, G. J. M., & Solomon, C. (2017). What's in a game? A systems approach to enhancing performance analysis in football. *PLOS ONE*, *12*(2), e0172565. https://doi.org/10.1371/journal.pone.0172565

Morgulev, E., & Lebed, F. (2024). Beyond key performance indicators. *German Journal of Exercise and Sport Research*, *54*(3), 335–340. https://doi.org/10.1007/s12662-024-00944-8

Morley, D., Morgan, G., McKenna, J., & Nicholls, A. R. (2014). Developmental Contexts and Features of Elite Academy Football Players: Coach and Player Perspectives. *International Journal of Sports Science & Coaching*, *9*(1), 217–232. https://doi.org/10.1260/1747-9541.9.1.217

Mouchet, A., Harvey, S., & Light, R. (2014). A study on in-match rugby coaches' communications with players: A holistic approach. *Physical Education and Sport Pedagogy*, *19*(3), 320–336. https://doi.org/10.1080/17408989.2012.761683

Mulvenna, C., Bloyce, D., Twist, C., & Thomson, E. (2024). 'I code as much as I can because you never know what they might ask for'. The role of the coach in Performance Analysis: The

view of the analyst. *International Journal of Sports Science & Coaching*, *19*(6), 2345–2355. https://doi.org/10.1177/17479541241270426

Muniz-Pardos, B., Angeloudis, K., Guppy, F. M., Keramitsoglou, I., Sutehall, S., Bosch, A., Tanisawa, K., Hosokawa, Y., Ash, G. I., Schobersberger, W., Grundstein, A. J., Casa, D. J., Morrissey, M. C., Yamasawa, F., Zelenkova, I., Racinais, S., & Pitsiladis, Y. (2021). Wearable and telemedicine innovations for Olympic events and elite sport. *The Journal of Sports Medicine and Physical Fitness*, *61*(8). https://doi.org/10.23736/S0022-4707.21.12752-5

Nelson, L., James, N., Nicholls, S., Parmar, N., & Groom, R. (2023a). The importance of appearing trustworthy in the workplace: Performance analysts' perspectives. *Sport, Education and Society*, 1–17. https://doi.org/10.1080/13573322.2023.2288844

Nelson, L., James, N., Nicholls, S., Parmar, N., & Groom, R. (2023b). The importance of appearing trustworthy in the workplace: Performance analysts' perspectives. *Sport, Education and Society*, 1–17. https://doi.org/10.1080/13573322.2023.2288844

Nicholls, S. B., James, N., Bryant, E., & Wells, J. (2019). The implementation of performance analysis and feedback within Olympic sport: The performance analyst's perspective. *International Journal of Sports Science & Coaching*, *14*(1), 63–71. https://doi.org/10.1177/1747954118808081

Niforatos, E., Laporte, M., Bexheti, A., & Langheinrich, M. (2018). Augmenting Memory Recall in Work Meetings: Establishing a Quantifiable Baseline. *Proceedings of the 9th Augmented Human International Conference*, 1–7. https://doi.org/10.1145/3174910.3174920

Noroozi, O., & Hatami, J. (2019). The effects of online peer feedback and epistemic beliefs on students' argumentation-based learning. *Innovations in Education and Teaching International*, *56*(5), 548–557. https://doi.org/10.1080/14703297.2018.1431143

O Brien, P., Martin, D., & Bradley, J. (2021a). Differences in performance indicators between winners and losers in senior inter county hurling championship. *International Journal of Performance Analysis in Sport*, *21*(4), 630–640. https://doi.org/10.1080/24748668.2021.1932147

O Brien, P., Martin, D., & Bradley, J. (2021b). Differences in performance indicators between winners and losers in senior inter county hurling championship. *International Journal of Performance Analysis in Sport*, *21*(4), 630–640. https://doi.org/10.1080/24748668.2021.1932147

O'Donoghue, P. (2007). Reliability Issues in Performance Analysis. *International Journal of Performance Analysis in Sport*, *7*(1), 35–48. https://doi.org/10.1080/24748668.2007.11868386

Painczyk, H., Hendricks, S., & Kraak, W. (2017). Utilisation of performance analysis among Western Province Rugby Union club coaches. *International Journal of Performance Analysis in Sport*, *17*(6), 1057–1072. https://doi.org/10.1080/24748668.2018.1429757

Partington, M., Cushion, C., & Harvey, S. (2014). An investigation of the effect of athletes' age on the coaching behaviours of professional top-level youth soccer coaches. *Journal of Sports Sciences*, *32*(5), 403–414. https://doi.org/10.1080/02640414.2013.835063

Reeves, M. J., & and Roberts, S. J. (2013). Perceptions of Performance Analysis in Elite Youth Football. *International Journal of Performance Analysis in Sport*, *13*(1), 200–211. https://doi.org/10.1080/24748668.2013.11868642

Robertson, P. S. (2020). Man & machine: Adaptive tools for the contemporary performance analyst. *Journal of Sports Sciences*, *38*(18), 2118–2126. https://doi.org/10.1080/02640414.2020.1774143

Sarmento, H., Bradley, P., & Travassos, B. (2015). The Transition from Match Analysis to Intervention: Optimising the Coaching Process in Elite Futsal. *International Journal of Performance Analysis in Sport*, *15*(2), 471–488. https://doi.org/10.1080/24748668.2015.11868807

Schommer, M. (1998). The influence of age and education on epistemological beliefs. *British Journal of Educational Psychology*, *68*(4), 551–562. https://doi.org/10.1111/j.2044-8279.1998.tb01311.x

Smith, M., & Cushion, C. J. (2006). An investigation of the in-game behaviours of professional, top-level youth soccer coaches. *Journal of Sports Sciences*, *24*(4), 355–366. https://doi.org/10.1080/02640410500131944

Three Approaches to Qualitative Content Analysis. (n.d.). https://doi.org/10.1177/1049732305276687

Travis, P., & Butterworth, A. (2024). Elite professional football players' perceptions and preferences of pre-match meeting delivery. *International Journal of Performance Analysis in Sport*, 1–16. https://doi.org/10.1080/24748668.2024.2437596

Warrens, M. J. (2015). Five Ways to Look at Cohenâ□□s Kappa. *Journal of Psychology & Psychotherapy*, *05*(04). https://doi.org/10.4172/2161-0487.1000197

Watson, N., Durbach, I., Hendricks, S., & Stewart, T. (2017). On the validity of team performance indicators in rugby union. *International Journal of Performance Analysis in Sport*, *17*(4), 609–621. https://doi.org/10.1080/24748668.2017.1376998

Wright, C., Atkins, S., & Jones, B. (2012a). An analysis of elite coaches' engagement with performance analysis services (match, notational analysis and technique analysis). *International Journal of Performance Analysis in Sport*, *12*(2), 436–451. https://doi.org/10.1080/24748668.2012.11868609

Wright, C., Atkins, S., & Jones, B. (2012b). An analysis of elite coaches' engagement with performance analysis services (match, notational analysis and technique analysis). *International Journal of Performance Analysis in Sport*, *12*(2), 436–451. https://doi.org/10.1080/24748668.2012.11868609

Wright, C., Atkins, S., Jones, B., & Todd, J. (2013a). The role of performance analysts within the coaching process: Performance Analysts Survey 'The role of performance analysts in elite football club settings.' *International Journal of Performance Analysis in Sport*, *13*(1), 240–261. https://doi.org/10.1080/24748668.2013.11868645

Wright, C., Atkins, S., Jones, B., & Todd, J. (2013b). The role of performance analysts within the coaching process: Performance Analysts Survey 'The role of performance analysts in elite

football club settings.' *International Journal of Performance Analysis in Sport*, *13*(1), 240–261. https://doi.org/10.1080/24748668.2013.11868645

Wright, C., Carling, C., & Collins, D. (2014). The wider context of performance analysis and it application in the football coaching process. *International Journal of Performance Analysis in Sport*, *14*(3), 709–733. https://doi.org/10.1080/24748668.2014.11868753

Wright, C., Carling, C., Lawlor, C., & Collins, D. (2016). Elite football player engagement with performance analysis. *International Journal of Performance Analysis in Sport*, *16*(3), 1007–1032. https://doi.org/10.1080/24748668.2016.11868945

Young, D., Beato, M., Mourot, L., & Coratella, G. (2020). Match-Play Temporal and Position-Specific Physical and Physiological Demands of Senior Hurlers. *The Journal of Strength & Conditioning Research*, *34*(6), 1759. https://doi.org/10.1519/JSC.0000000000002844