

Beyond Conventional Coaching: The Role of Transitional Information in Guiding Athlete Attentional Search for Adaptive Performance

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Abstract

In contemporary coaching, verbal augmented information (feedback and instruction) remains a widely used, but inconsistently applied tool for directing athletes' attentional search to improve their performance. Coaches often overlook how augmented information may be used to guide athletes' search for functional solutions within dynamic performance environments. Feedback is typically delivered either concurrently (during an action) or terminally (after an action), often in the form of error correction aimed at reproducing idealized movement solutions. This position paper draws on an ecological dynamics rationale to help coaches become more effective in their use of verbal augmented information. This paper presents the Transitional Learning Model (TLM) as an applied framework that integrates and extends existing approaches to instruction, feedback, and practice design. Within this model, coaches may use clues, challenges and questions, priming athletes to attune to affordances available in their performance environment. This approach aims to promote athletes to search, discover and exploit functional movement solutions within the performance environment. TLM may be applied concurrently or terminally, with transitional information

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functioning to guide the athletes' ongoing search activities for their next action in a performance environment. The TLM is proposed as a conceptual framework and requires further empirical investigation through applied and in-situ research designs to examine its effectiveness in supporting athlete learning.

Keywords

verbal feedback, coaching behaviour, attentional search, transitional information, augmented information, ecological dynamics

Introduction

The role of augmented information, such as verbal feedback and instruction, has long been central to research in motor learning, skill acquisition, and performance enhancement (Chow et al., 2013; Holding, 1965; Newell & Ranganathan, 2010). Augmented information refers to extrinsic input from a coach or technological display (Newell, 2003; Sigrist et al., 2013) that supplements athletes' intrinsic feedback, derived from self-reflection on performance (Schüker et al., 2009). Rather than prescribing actions or evaluating performance, verbal feedback can be used to support athlete exploration and discovery of functional solutions within the performance environment (Correia et al., 2019; Davids, 2012). While other extrinsic feedback modalities exist (e.g., visual, haptic) (Cope et al., 2017; Otte et al., 2020), verbal feedback remains one of the most dominant coaching behaviours in sport (Corbett et al., 2024; Page et al., 2025; Partington & Cushion, 2013; Raya-Castellano et al., 2020). Despite its widespread use, verbal feedback may not consistently support long-term learning and performance (Williams & Wigmore, 2020).

Observed improvements in performance during practice may not reflect underlying learning, potentially inducing coaches to over-rely on instruction and feedback that may produce immediate, but transient, effects (Williams & Hodges, 2023). For instance, athletes may recall approximately 50% of summarized feedback immediately, but that proportion may reduce to less than 6% after 1 week without further reinforcement, suggesting a gap between what is communicated and what is retained over time (Mason et al., 2020). From a practical perspective, corrective verbal feedback delivered in isolation from task design may have limited influence on long-term learning, particularly in football, where performance emerges through continuous interactions between the player and the surrounding performance environment (Chow et al., 2022; Salmoni et al., 1984). The effectiveness of coach-delivered verbal feedback and instruction may be further constrained by athletes limited capacity to retain, process and act upon large volumes of verbal information, particularly within time-pressured and emotionally demanding performance environments like football training and match play (Raya-Castellano et al., 2022).

In association football, coaching practices are often characterized by prescriptive, coach-led feedback aimed at directing athletes to reproduce predetermined movement

techniques (Corbett et al., 2024; Davids et al., 2008; Jones et al., 2026). Observational evidence indicates that players spend substantial periods of training time listening to a coach rather than actively engaging in practice (O'Connor et al., 2017). When coaching interactions become dominated by coach talk, opportunities for athlete exploration, problem solving, and adaptation within dynamic performance environments may be reduced. This tendency is also reflected in coaching education, where instructional models may continue to prioritize technical replication and coach control over creativity, decision-making, and contextual understanding (Nunes & Petiot, 2026).

Despite the continued prevalence of prescriptive and coach-directed practices, some have called for a “hands off” approach to coaching (Handford et al., 1997), characterized by reduced reliance on frequent instruction and feedback, and greater emphasis on athlete search activity during practice and guided discovery and representative practice design (see also Corbett et al., 2024; Williams & Hodges, 2023). Coaching approaches characterised by frequent instruction, technical replication, and high levels of coach control may create a disconnect between training activities and the adaptive demands of competition environments, where perception, decision-making, and action continuously emerge through interactions with changing task and environmental constraints (Davids et al., 2013; Pinder et al., 2011).

Athlete search processes may therefore be made more open or closed through the design of tasks and the use of feedback, depending on learner needs and the intended simplification of task demands (Chow et al., 2025; Lindsay & Spittle, 2024). Coaching effectiveness depends on selecting and adapting approaches based on the specific constraints of the learning environment, being strategic in the timing and use (Williams & Hodges, 2023), and the needs of the athlete (Lindsay & Spittle, 2024), with feedback directed toward facilitating functional task outcomes rather than correcting movement patterns solely on the basis of perceived technical error (Chow et al., 2022; Davids et al., 2008; Handford et al., 1997).

Coaches frequently isolate and deconstruct the mechanics of player actions, particularly in relation to technical skill execution (e.g., passing, dribbling, shooting), offering step-by-step instructions to address performance issues (Peh et al., 2011). Importantly, feedback should not aim to correct all observable movement variability but rather focus on the action variations that may meaningfully impede an athlete's achievement of successful task outcomes, allowing athletes to explore functional movement solutions rather than conform to idealized movement templates or techniques (Lindsay & Spittle, 2024). Although some coach education programmes promote game-based and inquiry-led designs, these problem-solving approaches often remain limited in scope and implementation, with evidence suggesting inconsistent adoption and a tendency for coaches to revert to over-use of contemporary linear approaches that are prescriptive by nature in applied settings (Richardson et al., 2023). Consequently, many training environments restrict athletes' engagement with relevant information from the environment (Seifert et al., 2013). Such practices may reduce opportunities for autonomous decision-making by encouraging predetermined responses to artificially constructed problems (Corbett et al., 2024; Lindsay & Spittle,

2024; Winstein & Schmidt, 1990). This may limit their capacity to attune to relevant environmental information and regulate their own actions, creating a dependency on coach feedback rather than self-directed performance ((Davids, 2012; Farrow et al., 2013; Williams & Hodges, 2005).

Misaligned learning further emerges when feedback emphasises reproducing idealised movement patterns over contextual adaptability, widening the gap between training and the dynamic demands of football (Davids et al., 2008; Mason et al., 2020). While controlled and non-representative practice environments may offer benefits in reducing task complexity and supporting the initial acquisition of specific movement skills (Newell, 1986; Schmidt & Lee, 2011), behaviors developed in isolation do not always transfer effectively under competitive pressure, particularly when perception-action couplings are not preserved (Araújo & Davids, 2016; Gray, 2021; Williams & Wigmore, 2020). From an ecological perspective, football performance emerges through continuous perception-action coupling, where movements are guided by the detection of information within the environment (Davids et al., 2005; Gibson, 1979; Jordet et al., 2020). To address these limitations, recent work has begun to reconceptualize coach feedback as a means of guiding attentional search rather than prescribing solutions. For example, *transitional feedback* (Newell, 2003) may be used to guide players' attention toward key affordances during and after performance, potentially supporting perception-action coupling and the exploration of adaptive performance solutions (Gray, 2021; Jones et al., 2021). In this view, feedback is conceptualised not as an isolated corrective intervention, but a co-adaptive process embedded within the performance environment (Davids et al., 2022). Within this perspective, coaching is conceptualized as an adaptive decision-making process, where informational feedback strategies are continuously adjusted in response to the evolving performance environment (Lindsay & Spittle, 2024).

Although augmented verbal feedback may support learning, its optimal use remains debated and appears highly dependent on context, task demands, and practice design (Otte et al., 2020; Sigrist et al., 2013; Williams & Hodges, 2023). Recent work highlights that effective practice is not defined by the amount of instruction provided, but by how practice conditions, task design, and feedback interact to support long-term learning and transfer (Williams & Hodges, 2023). Emerging evidence also suggests that learner agency in feedback timing, such as self-controlled feedback, may enhance learning and retention, although this remains debated (McKay et al., 2022; Sigrist et al., 2013; Yamaguchi et al., 2026).

Drawing from Newell's (2003) early work on motor learning, three main categories of augmented information that are delivered concurrently or terminally can be identified: (i) Prescriptive Information, which instructs how to perform a solution; (ii) Information Feedback, which describes performance and suggests corrections; and (iii) Transitional Information, which guides an individual's search for solutions. The latter remains relatively unexplored in both research and practice and may help direct athletes toward relevant environmental information without prescribing specific movement solutions (Newell, 2003). This perspective aligns with direct learning approaches that emphasise the role of information in guiding action without the need

for explicit internal representations (Jacobs & Michaels, 2007). Contemporary perspectives increasingly conceptualise learning as an adaptive process of search (Newell, 1991, 2003) emerging from interactions among task, environmental, and informational constraints (Lafe & Newell, 2022). From this perspective, informational interventions may function less as prescriptions of behaviour and more as constraints that shape learning and performance. Consequently, there remains a need for frameworks that extend beyond prescribing what coaches should do and instead support how informational strategies may be adapted to specific contexts and learner needs (Davids et al., 2026; Reeves et al., 2026).

Grounded in principles of coordination and perception-action coupling, this position paper presents a Transitional Learning Model (TLM) underpinned by the principle of *Direction without Dictation*, to support coaches in using augmented information without prescribing specific movement solutions. Rather than providing ready-made answers, coaches may use feedback to reduce unnecessary complexity, draw attention to task-relevant information, and support engagement with opportunities for action. From this perspective, feedback functions less as a corrective mechanism and more as an informational constraint (Newell & Ranganathan, 2010) that shapes athlete-environment interactions during learning (Juarro, 2023; Otte et al., 2020). The TLM therefore provides a practical framework for designing representative, decision-rich learning environments in which verbal interactions support adaptation and the emergence of functional performance solutions (Newell & Ranganathan, 2010; Wood et al., 2020a).

Although this principle may appear similar to attentional focus and cueing approaches, which direct attention toward specific movement effects, metaphors, or body-environment relationships (Winkelman, 2020; Wulf, 2013), it differs in an important way. Rather than providing a cue that specifies where attention should be directed, *Direction without Dictation* frames informational challenges that require athletes to identify and act upon relevant information within the performance environment. For example, attentional focus approaches may encourage athletes to attend to a particular movement effect such as “drive the ground explosively” to attempt directing attention toward a predetermined aspect of performance. In contrast, Transitional Information when used in football coaching context, may invite athletes to solve a performance problem such as “How can your pass or dribble eliminate two or more defenders?”, requiring the athlete to search for relevant information, identify emerging affordances, and determine their own functional solution. This distinction aligns with recent conceptualisations of team tactical principles as attentional anchors that guide players toward relevant information within the game environment rather than prescribing specific movement solutions (Jones et al., 2026). In this way, verbal interactions are used less to direct attention toward predetermined cues and more to support engagement with information that emerges through interaction with affordances within the performance environment. This is reflected in Table 1, where different forms of language are used to shape athlete-environment interactions and support the emergence of functional performance solutions.

Table 1. Description Table of Transitional Information Methods in Coaching Football

Transitional information methods			
Method	Clue	Challenge	Question
Description of interaction	Provides athletes with specific information about the environment or situation, guiding their decisions without prescribing a solution	Poses a task that encourages athletes to solve problems creatively and think critically, promoting deeper learning through exploration and interaction with the environment	Prompts athletes to reflect on their actions, stimulating critical thinking and self-assessment to explore different solutions.
Football coaching example	<i>“The opponent has left space between and around their center backs open as they push their full-backs up the field. Try to identify a moment when you can exploit this”</i>	<i>“How can your pass or dribble eliminate two or more defenders?”</i>	<i>“How can your first touch allow you to play forward?” or “How can you create space for yourself or your teammate?”</i>

Verbal Feedback and Activity Design: The Importance of Search

The challenge for coaches lies not in whether to use verbal feedback, but in *how* feedback is integrated with in learning environments to support decision-making, adaptation, and performance (Winkelman, 2020). The nature of coach feedback is closely intertwined with practice design. Tasks centred on the rehearsal of pre-determined solutions may encourage more prescriptive forms of communication, whereas representative and decision-rich activities may create opportunities for feedback that supports exploration, adaptation, and engagement with task-relevant information (Davids, 2015a; Otte et al., 2019; Williams & Hodges, 2023). From this perspective, coach feedback can be viewed less as the transmission of solutions and more as the design of informational challenges that channel attentional search toward relevant affordances within the performance environment (Jones et al., 2026). Rather than prescribing specific actions, verbal interactions may help athletes engage with key sources of information while preserving opportunities for exploration and adaptation. Alternative perspectives on feedback and instruction include models such as Wulf’s OPTIMAL Theory (Wulf, 2013; Wulf & Lewthwaite, 2016), which emphasises enhanced expectancies, autonomy-supportive feedback, and goal-directed practice. While these perspectives provide valuable insights into the structuring of feedback and instruction, an ecological dynamics perspective places greater emphasis on the design of learning environments that enable athletes to attune to relevant information through

exploration and interaction (Davids, 2012a; Schücker et al., 2009). Within this perspective, feedback and instruction retain an important role, not as mechanisms for prescribing solutions, but as tools that support engagement with the performance environment (Davids, 2012).

In adopting this approach, the coach’s role evolves from a prescriber of corrective feedback to a learning designer who manipulates constraints (Otte et al., 2019; Woods et al., 2020b) to create representative and decision-rich environments (Davids, 2012). This perspective provides the foundation for *Transitional Learning Model*, where feedback is used to guide engagement with information, support adaptation, and facilitate the emergence of functional performance solutions.

The TLM is structured across four interconnected levels:

- (1) A guiding principle (“Direction without Dictation”);
- (2) A mechanism (Transitional Information);
- (3) Delivery methods (Clues, Challenges, and Questions); and
- (4) Evaluative principles (Inspire, Involve, and Inform).

An Ecological Dynamics Perspective on Augmented Feedback in Football: From Prescriber to Learning Designer

The TLM offers a flexible framework for using verbal feedback to support athlete learning within representative performance environments (Figure 1). Grounded in

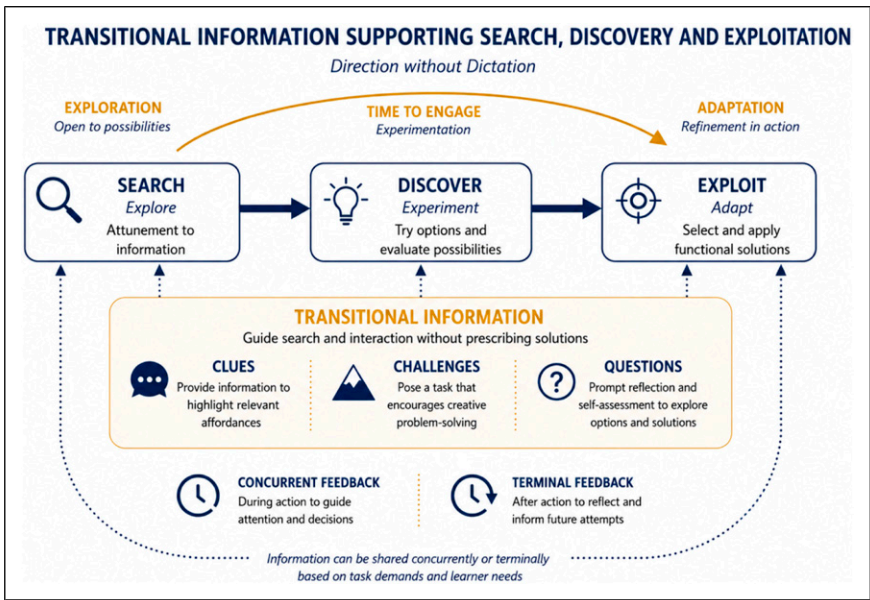


Figure 1. Transitional information supporting search, discovery and exploitation

ecological dynamics, the model is based on a “search-discover-exploit” process (Davids et al., 2008), in which players are afforded opportunities to engage with affordances (Davids, 2015b) and adapt their actions to emerging task demands. In practice however, coaches can often provide feedback or instruction and then immediately follow with additional cues or questions (Mason et al., 2020). This rapid sequencing affords players little time to explore their environment, engage with the problem, or self-regulate their responses.

Transitional Information operates through clues, challenges, or questions that guide athletes’ interaction with the performance environment without prescribing specific movement solutions. Rather than directing behaviour toward predetermined outcomes, it encourages engagement with relevant sources of information while preserving opportunities for adaptation. In this sense, the objective is not to prescribe attentional targets, but to support adaptive interactions with emerging task demands. Related perspectives, such as external focus of attention research and OPTIMAL theory highlight the benefits of directing attention toward movement effects and supporting autonomy in learning (Wulf, 2013; Wulf & Lewthwaite, 2016), these perspectives primarily focus on the induction of attentional and motivational states. By using feedback to channel player’s attention toward relevant environmental information, coaches can help players self-organise their actions and exploit time and space through adaptive solutions (Davids et al., 2026; Renshaw & Chow, 2019). Such interactions may support how coaches can prime players to attune to relevant environmental information (Davids, 2012) and encourage experimentation with alternative responses (Newell, 2003).

Coaches can employ clues, challenges, and questions transitionally to guide engagement with relevant environmental information (see Table 1). This approach can enhance players’ problem-solving skills and situational awareness (Davids et al., 2008). It embodies Bernstein’s principle of “repetition without repetition,” where learning occurs through the repeated solving of movement problems rather than reproducing fixed techniques.

Within the TLM, clues, challenges, and questions transform feedback from a mechanism for providing answers into a mechanism for creating player challenges. Rather than prescribing solutions, coaches design interactions that encourage athletes to evaluate possibilities, explore alternatives, and adapt their behaviour in response to changing task demands.

Figure 2 presents the Transitional Learning Model as a two-dimensional framework rather than a single continuum. The horizontal axis reflects the orientation of information, ranging from a focus on movement mechanics to engagement with environmental information. The vertical axis represents the nature of augmented information, ranging from more explicit and prescriptive forms to more implicit, exploratory and athlete-centered forms. Together, these dimensions illustrate how coaching behaviours may shift according to context, task demands and athlete needs.

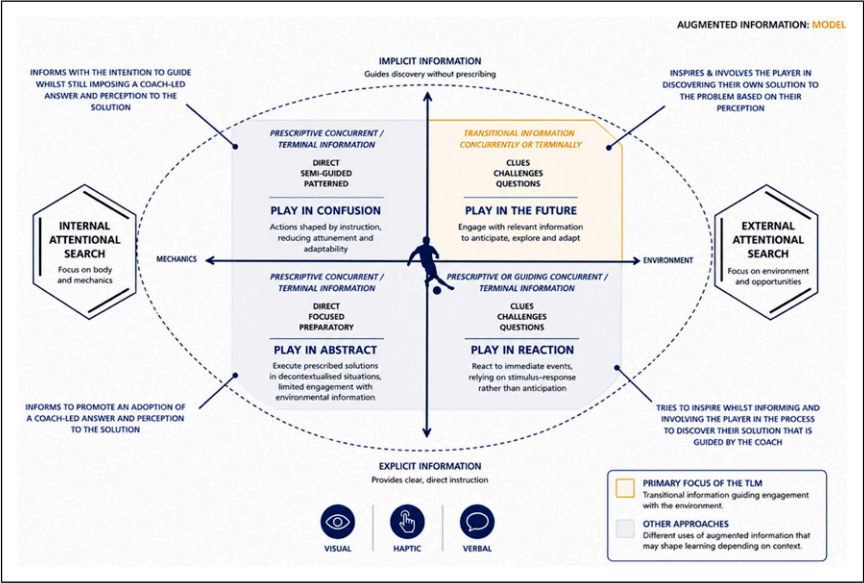


Figure 2. The transitional learning model: Positioning augmented information within attentional search

Positioning of Augmented Information Within the TLM Framework

To avoid bias toward any single strategy, the TLM positions the learner at the center of the process, encouraging coaches to adapt their communication to individual needs. A learner-centred approach considers the principles being developed, the athletes’ skill level, and the intended learning outcomes (Sadowski et al., 2011). Coaches must plan language carefully, choosing questions, prompts, and key phrases aligned with the club’s philosophy to shape players’ intentions and inform practice design (Jones, 2015). The TLM conceptualizes augmented information as a framework that facilitates the athlete’s search within the perceptual-motor workspace.

Within this framework, the upper-right quadrant represents the use of transitional information to guide athletes’ search toward relevant environmental information, supporting exploration, anticipation, and adaptive decision-making. This is reflected in the notion of “playing in the future,” where players actively engage with emerging affordances. In contrast, the remaining quadrants illustrate how different uses of augmented information may shape learning in alternative ways. More prescriptive or semi-guided approaches may lead to players relying on coach-directed solutions, resulting in “playing in reaction” or “playing in confusion,” where actions are shaped by instruction rather than ongoing interaction with the environment. At the extreme, highly explicit and decontextualised instruction may lead to “playing in abstract,”

where movement execution becomes disconnected from the informational demands of the game and the players are not identifying information from the environment, but instead executing the exact solution the coach informed. Importantly, these regions do not represent fixed or undesirable practices but highlight how different uses of augmented information may influence the nature of learning depending on context. For instance, when a coach asks, “How can your pass or dribble eliminate two or more defenders?” or provides a prompt to explore gaps left by opponents, they guide the player’s attention toward relevant environmental information, fostering problem-solving, anticipation, and adaptability. This approach encourages players to “play in the future” by using environmental information to guide their decisions. Rather than imposing ready-made solutions, *transitional feedback* encourages exploration and discovery. In doing so, feedback may function as an enabling constraint that channels exploration toward relevant affordances while preserving the athlete’s autonomy to discover functional solutions (Jones et al., 2026).

While this may appear similar to the use of open-ended questioning, the distinction lies in the intent and function of the interaction. Open-ended questions can still be used to guide athletes toward a coach-prescribed solution, whereas Transitional Information is designed to guide the athlete’s search for relevant environmental information without implying a correct answer. In this sense, the focus shifts from eliciting responses to shaping perception-action coupling. This distinction may be particularly important given evidence suggesting that coaches often begin with divergent questioning before progressively shifting toward convergent questioning and instructional behaviours, ultimately directing athletes toward coach-preferred responses (Raya-Castellano et al., 2026).

The purpose of this framework is not to position one approach as inherently superior, but to highlight how different forms of augmented information may influence learning depending on how and when they are used. In some contexts, more explicit and instruction-led approaches can play a functional role in simplifying tasks, directing attention, or supporting early stages of learning. However, when overused or applied in isolation from representative performance environments, such approaches may lead to players relying on coach-provided solutions, limiting their ability to attune to relevant information in context. In these situations, players may experience “playing in abstract” or “playing in confusion,” where the transfer of learning to dynamic game situations is reduced (Araújo & Davids, 2016). At the same time, these conditions can still provide opportunities for learning, as athletes may explore, adapt, and discover effective solutions through interaction with the environment (Seifert et al., 2013).

Coaches should focus on observing and identifying opportune moments to intervene, tailoring feedback to the learner’s specific needs. This approach emphasises designing learning experiences that are representative, challenging, and individualised. Practice design plays a decisive role, as small-sided and representative activities foster decision-making, unpredictability, and adaptability. By manipulating constraints (Davids, 2015b), coaches create environments where affordances emerge naturally (Light et al., 2013), allowing players to search and act without over-reliance on explicit direction (Davids et al., 2008). Practice design and feedback should be viewed as

inseparable components of the learning process, with both acting to shape the athlete’s interaction with affordances available within the performance environment (Jones et al., 2026).

Finally, athletes benefit from autonomy in how and when they receive feedback (Wulf & Lewthwaite, 2016), which supports motivation and self-regulation (Singh et al., 2020). However, over-reliance on coach-led instruction may increase dependency, reducing opportunities for athletes to regulate their own actions and adapt independently when guidance is withdrawn (Chiviacowsky & Wulf, 2002). Using the TLM, coaches can reflect on how effectively they inform, inspire, and involve players through verbal interactions (see Figure 3).

Applying Transitional Information: The 3Is (Inspire, Involve and Inform)

To operationalize Transitional Information in practice, three interconnected principles are proposed. These principles support how coaches use verbal interactions to guide learning within dynamic performance environments. The 3Is are proposed as an integrative framework that synthesises concepts from skill acquisition, motivation, and coaching pedagogy to support the application of Transitional Information in practice. Figure 3 outlines how the core strands of Transitional Information are enacted through three guiding principles of application (Inspire, Involve, Inform), alongside key contextual factors that shape coach–athlete interactions:

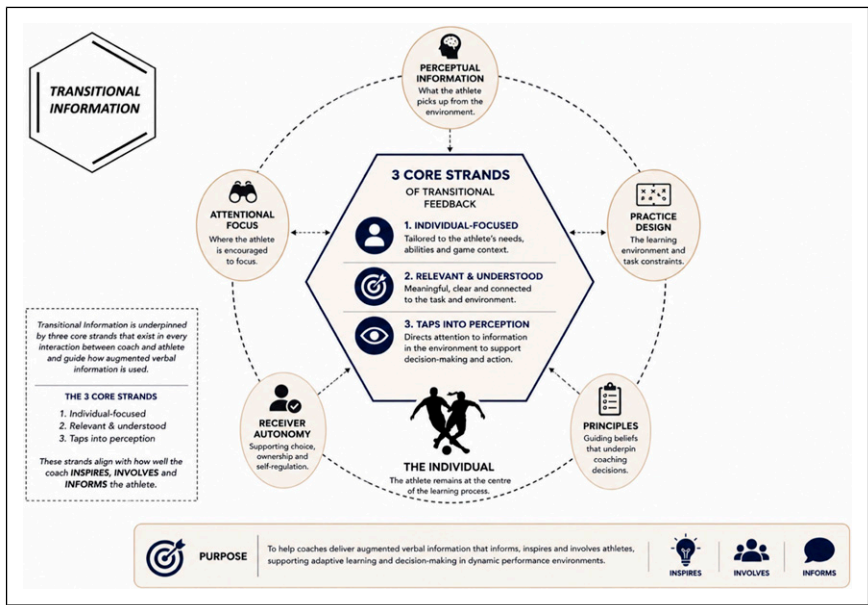


Figure 3. Core strands of transitional information guiding coach-athlete interactions

Inspire players by stimulating curiosity and intrinsic motivation, encouraging engagement with the learning process. This aligns with work on autonomy-supportive environments and enhanced expectancies, which have been shown to positively influence motivation and learning (Wulf & Lewthwaite, 2016), as well as research highlighting the role of challenge and engagement in facilitating exploration (Guadagnoli & Lee, 2004; Hodges & Lohse, 2022).

Involve players through problem-based and interactive experiences that support autonomy and active participation. This is consistent with research on athlete-centred and game-based approaches, which emphasise co-adaptation, decision-making, and learner engagement within representative environments (Chow et al., 2016; Light et al., 2012; O'Connor et al., 2017).

Inform players using contextually relevant feedback aligned with task and environmental demands. Evidence suggests that feedback is most effective when it is concise, purposeful, and supports the athlete's attunement to relevant information, rather than prescribing movement solutions (Corbett et al., 2024; Otte et al., 2020).

When embedded in practice, the “3Is” position feedback as a process of guiding exploration rather than correcting behaviour. Rather than prescribing solutions, coaches may use verbal interactions to shape how athletes engage with information in the environment. In this way, *Direction without Dictation* may support the development of adaptable and increasingly self-regulating performers.

Conclusions

Although a substantial body of research on augmented feedback exists, much of it originates from traditional, laboratory-based motor control studies rather than applied, in-situ sport contexts, leaving a critical gap in understanding how feedback functions within dynamic, representative environments (Mason et al., 2020). Current approaches often deliver augmented information concurrently or terminally in a prescriptive form (Cushion et al., 2012), reinforcing idealised movement templates rather than guiding adaptive search processes. Few studies have examined transitional information as an alternative, and even fewer have investigated feedback use in competitive or representative practice settings (Cope et al., 2017). Furthermore, the influence of coach education on how feedback is perceived, interpreted, and applied in everyday practice warrants closer scrutiny.

The TLM presented here reconceptualises feedback as a means of shaping athlete-environment interactions rather than prescribing corrective actions. Grounded in ecological dynamics, verbal information is positioned as a resource that may guide engagement with relevant information sources, support attunement to affordances, and encourage the exploration of functional solutions within dynamic performance environments. From this perspective, feedback is not viewed as a mechanism for transmitting solutions, but as part of the broader design of learning environments that support adaptation and self-regulation. Through the principle of *Direction without*

Dictation, coaches may use verbal interactions to guide exploration while preserving flexibility in the solutions that emerge.

Future research should aim to test and refine the TLM through action-based methodologies, ethnographic inquiry, and applied intervention studies across diverse sport environments. For practitioners, the key implication is that practice design and feedback should not be considered separate coaching activities. Rather, both function together to shape how athletes engage with information, adapt to constraints, and develop functional performance solutions. Importantly, the TLM does not seek to replace existing approaches, but to reorient how instruction and feedback are understood and applied within dynamic learning environments. By adopting a transitional approach, football coaching can move beyond correction and compliance toward exploration, adaptability, and deeper, more self-regulated learning.

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No new data were created or analyzed in this study. Data sharing is not applicable to this article.

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