ORIGINAL ARTICLE

The model-to-task translation process in football coaching

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ABSTRACT

The game model is central to football coaching, yet its conceptual boundaries and its role in linking strategic intentions with practice remain insufficiently defined. Contemporary approaches explain representative learning, constraint manipulation and player adaptation, but provide limited guidance on how game-model principles should inform the design and evaluation of training tasks. This paper proposes the Model-to-Task Translation Process (MTTP), an integrative conceptual and decision-guiding framework that links coaching philosophy, game idea, game-model principles, training priorities, task constraints, learning environments and behavioural emergence. It draws selectively on Tactical Periodization, Ecological Dynamics, the Constraints-Led Approach, Nonlinear Pedagogy and Coaching Pedagogy while acknowledging their distinct analytical levels and theoretical assumptions. The MTTP positions the game model as the primary reference for deciding what should be developed, while ecological and pedagogical perspectives inform how practice opportunities are designed and regulated. Its distinctive contribution lies in specifying a recursive and empirically examinable translation pathway, distinguishing model–task alignment from training representativeness, and providing preliminary operational criteria, an applied football case and six testable propositions. The MTTP is presented as a conceptual proposition requiring empirical validation, not as a prescriptive or validated training method.

Keywords: performance analysis; coaching pedagogy; ecological dynamics; representative learning design; constraints-led approach; tactical performance; coach education.

Cite this article as:
Brito, Â. (2026). The model-to-task translation process in football coaching. *Journal of Human Sport and Exercise, 21*(4), 1516-1556. https://doi.org/10.55860/p29fw703

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Submitted for publication July 02, 2026.
Accepted for publication August 06, 2026.
Published August 19, 2026.
Journal of Human Sport and Exercise. ISSN 1988-5202.

doi: https://doi.org/10.55860/p29fw703

INTRODUCTION

The rise of game models in football

In contemporary football, the game model has become a central reference for organising training, guiding tactical performance and shaping team identity. Although the term has been used with different meanings across professional and academic contexts, it is generally understood as the set of principles through which a team organises its play in competition (Castelo, 1994; Garganta, 1997, 2009; Plakias, 2023). It has therefore evolved beyond a descriptive account of tactical organisation into a key concept linking coaching intentions, training practice and competitive performance.

This growing importance reflects the complex and interactive nature of football. Team performance cannot be adequately explained as the sum of isolated technical actions or individual decisions; rather, it emerges from continuous interactions among players, opponents, space, time, the ball and the wider competitive environment (Araújo et al., 2006; Davids et al., 2013; Duarte et al., 2012). Coaching therefore requires more than transmitting tactical instructions. It requires establishing shared references that enable players to interpret game situations, coordinate their actions and adapt collectively under changing constraints.

From this perspective, the game model can be understood as a dynamic and hierarchical system of principles that provides functional coherence while preserving the adaptability required by competitive variability (Davids et al., 2013; Seifert et al., 2017). It should not be reduced to a tactical formation, a preferred playing style or a catalogue of predefined movements. Instead, it represents the organisational reference through which coaching intentions are translated into coordinated team performance.

This places the game model at the centre of coaching practice. If it defines how a team intends to solve the problems posed by the game, training must provide learning experiences that help players perceive, decide and act accordingly. The game model therefore acquires practical value only when operationalised through representative learning environments that allow players to explore, stabilise and adapt the principles underpinning the intended way of playing (Pinder et al., 2011; Woods et al., 2020).

Persistent conceptual ambiguity

Despite its growing prominence in both academic literature and professional practice, the concept of a game model remains characterised by considerable conceptual ambiguity. Within football coaching, it is frequently used interchangeably with related notions such as game idea, playing style, tactical system, team identity and tactical organisation. Although these concepts are closely connected, they represent different levels of analysis and fulfil distinct functions within the coaching process (Garganta, 2009; Plakias, 2023). As a result, the literature often assumes a shared understanding of the game model without defining its conceptual boundaries.

This ambiguity is particularly evident in the distinction between a game model and a game idea. Coaches commonly express their intentions through broad statements such as *dominate possession*, *press aggressively* or *attack vertically*. While these statements communicate a strategic vision, they do not constitute a game model. They acquire operational value only when translated into coherent principles capable of guiding collective action and informing training design.

A similar source of confusion concerns the relationship between the game model and playing style. Playing style generally refers to the observable patterns displayed during competition (Rein & Memmert, 2016; Sarmento et al., 2018), whereas the game model serves as the organisational and pedagogical reference

that guides their development. Put differently, playing style describes what a team tends to do, whereas the game model defines the principles through which coaches seek to influence how the team plays.

The absence of clear conceptual distinctions has important implications for both research and practice. Scientifically, it hinders cumulative knowledge by making comparisons across studies more difficult. Practically, it may encourage coaches to assume that expressing a preferred way of playing is sufficient to guide training. Without distinguishing strategic intentions from the principles that operationalise them, it becomes difficult to evaluate whether practice tasks, learning processes and competitive performances are aligned with the intended game model.

Clarifying these concepts is therefore more than a semantic exercise. It provides the theoretical foundation required to examine how coaching intentions are translated into practice and establishes the conceptual basis for the integrative framework proposed in this paper.

The missing link between game models and training design

A second limitation in the current literature concerns the relationship between game models and training design. Over the past two decades, Ecological Dynamics, the Constraints-Led Approach, Nonlinear Pedagogy and Representative Learning Design have substantially advanced understanding of how learning emerges in complex sporting environments (Araújo et al., 2006; Davids et al., 2013; Chow et al., 2016, 2022; Woods et al., 2020). Collectively, these perspectives have demonstrated that learning is shaped by the interaction of performers, tasks and environmental constraints, shifting the emphasis from reproducing predefined solutions towards designing environments that support adaptive behaviour.

Despite these advances, considerably less attention has been devoted to explaining how game model principles should guide the design of those environments. Contemporary learning theories provide sophisticated accounts of how players learn, but less guidance on how coaching intentions are translated into training priorities and task design.

This limitation is particularly relevant because training tasks have no intrinsic methodological value. Their effectiveness depends not only on physical or technical demands, but on the extent to which they support the intended way of playing. Designing practice therefore involves more than creating representative learning opportunities; it requires translating tactical priorities into problems that players repeatedly experience and solve during training.

Achieving this alignment requires a sequence of interconnected decisions. Coaches must identify the principles they wish to develop, establish corresponding training priorities, manipulate appropriate task constraints and create learning environments that consistently expose players to relevant tactical problems. Although each of these elements has been examined individually, their integration within a coherent conceptual framework remains underdeveloped.

The central challenge, therefore, is not whether game models or representative learning environments matter, but how they become systematically connected throughout the coaching process. Addressing this gap requires a framework that explains how coaching intentions are progressively translated into training priorities, task design and player development. This need provides the rationale for the Model-to-Task Translation Process (MTTP).

Purpose, scope and contribution of the paper

To address the model-to-task translation gap, this paper proposes the Model-to-Task Translation Process (MTTP), an integrative conceptual and decision-guiding framework that organises the relationships through which coaching intentions are translated into training priorities, task-design decisions, learning environments and observable team behaviours. Its primary purpose is to make explicit a process that is often enacted intuitively in coaching practice but remains insufficiently articulated in the football coaching literature.

The MTTP is not proposed as a training method, periodization model or prescriptive sequence of exercises. Nor is it intended to replace the theoretical perspectives from which it draws. Rather, it provides a higher-order translational structure that assigns distinct functions to different levels of coaching decision-making. Coaching philosophy and the game idea establish broad strategic orientation; the game model specifies the principles intended to organise collective play; training priorities identify the problems to be developed; task constraints shape the opportunities for action available in practice; learning environments emerge from the interaction of task design, players, contextual information and pedagogical intervention; and observable behaviours provide evidence with which the coherence and effects of the process may be evaluated.

The framework addresses a specific problem that existing perspectives do not fully resolve in isolation. Tactical Periodization emphasises the need for training to remain coherent with the intended way of playing but provides less detailed explanation of the adaptive learning mechanisms operating within practice. Ecological Dynamics and the Constraints-Led Approach explain how behaviour emerges through performer–environment interactions and constraint manipulation, but do not independently establish which tactical principles should orient those manipulations. Nonlinear Pedagogy and Coaching Pedagogy further inform the design and regulation of learning experiences, although they do not provide a complete structure connecting a team's strategic identity with the selection, implementation and evaluation of individual training tasks. The originality of the MTTP therefore lies not in introducing these constituent concepts independently, but in specifying their differentiated functions and organising them within a recursive and empirically examinable pathway connecting strategic intention, practice design and behavioural evaluation.

This organisation is based on conditional functional integration rather than epistemological equivalence: the framework draws selectively on contributions that operate at different analytical levels while preserving their conceptual distinctions and acknowledging the tensions among strategic direction, pedagogical intervention and adaptive emergence.

More specifically, the paper makes four contributions. First, it clarifies the conceptual distinctions between coaching philosophy, game idea, game model and playing style. Second, it proposes a translational architecture connecting strategic intentions, training priorities, task constraints, learning environments and behavioural emergence. Third, it distinguishes model–task alignment—the extent to which a task creates opportunities to develop a specified game-model principle—from representativeness—the extent to which practice preserves the information and action possibilities that regulate competitive performance. Fourth, it formulates an applied and research-oriented basis for operationalising, examining and empirically testing the relationships proposed within the framework.

The MTTP should therefore be understood as a conceptual proposition whose explanatory and practical value requires empirical examination. It does not assume that coherent task design automatically produces intended behaviours, nor that behavioural emergence follows a fixed linear sequence. Instead, it proposes a recursive process in which coaching intentions guide practice design, player–environment interactions shape

emergent behaviour, and observations from training and competition inform subsequent refinements to priorities, tasks and the game model itself.

Accordingly, the aim of this paper is to define the conceptual foundations of the MTTP, explain the proposed relationships between its components, demonstrate its potential application to football training design and establish propositions capable of guiding future empirical research. By doing so, the paper seeks to provide a more precise foundation for examining how intended ways of playing may become progressively expressed, adapted and evaluated through practice.

UNDERSTANDING THE GAME MODEL

Defining the game model

The concept of a *game model* occupies a central position within contemporary football coaching. Despite its widespread use, however, there is no universally accepted definition within either the academic literature or professional practice. Different authors have emphasised distinct dimensions of the concept, variously describing it as a framework for tactical organisation, a system of collective principles, a representation of the coach's intentions or a reference for guiding training and performance (Castelo, 1994, 2009; Garganta, 1997, 2009; Plakias, 2023). While these perspectives differ in emphasis, they share a common assumption: the game model functions as an organising reference through which collective behaviour is structured and developed.

Traditionally, game models have been associated with the need to establish coherence within the inherently dynamic and uncertain nature of football. Unlike approaches that reduce performance to isolated technical actions or predetermined tactical patterns, the game model seeks to provide players with a shared framework for interpreting and solving the problems that emerge during competition. In this sense, the model does not prescribe specific actions for every situation. Rather, it establishes principles that guide decision-making and coordination across the different moments of the game.

A game model may therefore be defined as a dynamic and hierarchical system of organisational principles and sub-principles that guides collective behaviour in accordance with the coach's interpretation of the game. The model provides a common reference through which players coordinate their actions, recognise tactical opportunities and respond adaptively to changing competitive conditions. Consequently, its purpose is not to eliminate uncertainty, but to create sufficient organisational coherence to support coordinated action under conditions of uncertainty.

Importantly, the game model should not be confused with tactical formations or positional structures. While formations may represent one possible expression of organisational intentions, they provide only a partial description of how a team seeks to play. The same game model may be expressed through different formations, just as similar formations may support substantially different organisational principles. Defining a team as playing in a 4–3–3 or a 3–5–2 reveals little about the principles governing its behaviour with or without the ball. Therefore, the game model operates at a deeper level of organisation than tactical structure alone.

The concept also extends beyond the description of collective behaviour during competition. Within contemporary coaching practice, the game model increasingly functions as a reference for training design and player development. Organisational principles established within the model influence the selection of training objectives, the design of learning environments and the behavioural tendencies that coaches seek

to promote. In this regard, the game model serves not only as a description of how a team intends to play, but also as a pedagogical framework through which learning and adaptation are organised.

Recent developments in ecological approaches to performance provide additional insight into this interpretation. From an ecological dynamics perspective, collective behaviour emerges through the continuous interaction of players with teammates, opponents and environmental constraints (Araújo et al., 2006; Davids et al., 2013; Seifert et al., 2017). The game model can therefore be understood not as a rigid blueprint imposed upon players, but as a set of organisational tendencies that channel adaptation without determining it. Its role is to shape the conditions under which coordinated behaviours emerge while preserving the flexibility required to respond to the changing demands of competition.

Accordingly, the game model should be viewed as both an organisational and a developmental construct. Organizationally, it provides a framework for collective coordination. Developmentally, it guides the design of training processes intended to support the emergence of behaviours consistent with the team's intended way of playing. This dual function is particularly important because it establishes the conceptual bridge between tactical organisation and training design that underpins the framework proposed in this paper.

Understanding the game model in this way moves the discussion beyond questions of tactical systems, preferred styles or isolated principles. Instead, it positions the model as a dynamic reference that links coaching intentions, training processes and collective behaviour. This interpretation forms the conceptual foundation of the Model-to-Task Translation Process developed throughout the remainder of the paper.

Game model versus game idea

The game idea and the game model are closely related but conceptually distinct. The game idea refers to the coach's broad strategic vision of how the team should approach the game. It expresses preferences, priorities and interpretative assumptions, such as the desire to dominate possession, press high, attack quickly or defend compactly. However, these broad intentions do not yet constitute an operational framework for collective behaviour.

The game model begins when this strategic vision is translated into coherent principles and sub-principles capable of guiding players' interactions across the different moments of play. In this sense, the game idea provides orientation, whereas the game model provides organisation. The former defines what the coach values; the latter specifies how those values are transformed into collective references for training and performance.

This distinction is important because coaches may possess a clear game idea without having developed a sufficiently explicit game model. When this occurs, training may reproduce general intentions without systematically shaping the tactical behaviours required to express them. Within the MTTP, the game idea therefore functions as an intermediate stage between coaching philosophy and the game model, while the game model constitutes the operational structure from which training priorities and practice tasks are derived.

Game model versus playing style

A further conceptual distinction concerns the relationship between the game model and playing style. Although closely related, the two concepts describe different aspects of football performance and fulfil distinct functions within coaching and performance analysis. Confusing them has contributed to persistent conceptual ambiguity, often leading observable performance patterns to be interpreted as synonymous with the principles that underpin them (Rein & Memmert, 2016; Sarmento et al., 2018; Plakias, 2023).

Within performance analysis, playing style generally refers to the recurrent patterns displayed by a team during competition. These may be identified through indicators such as positional organisation, passing networks, spatial occupation, pressing intensity or transition characteristics (Rein & Memmert, 2016; O'Donoghue, 2021). Playing style is therefore primarily descriptive: it characterises how a team performs rather than explaining why those patterns emerge.

The game model serves a different purpose. Rather than describing competitive performance, it provides the principles that guide coaching, training design and player development. In this sense, it represents the organisational logic through which coaches seek to influence the team's future performance, whereas playing style reflects the observable expression of that process.

The distinction may therefore be understood as one between intention and expression. The game model establishes a reference for how the team seeks to play; playing style reflects how that intention is manifested in competition. Importantly, this relationship is neither direct nor deterministic. Similar playing styles may emerge from different game models, while teams guided by comparable principles may display distinct competitive behaviours as a consequence of differences in player characteristics, opponents or contextual demands.

This interpretation is consistent with ecological perspectives on performance, which view team coordination as an emergent property of interactions among players and environmental constraints (Araújo et al., 2006; Davids et al., 2013; Seifert et al., 2017). From this viewpoint, the game model does not prescribe a fixed style of play; instead, it shapes the conditions under which particular patterns of play are more likely to emerge.

Recognising this distinction has important implications for both research and coaching. Analysing playing style provides valuable information about competitive performance, but it offers only a partial understanding of the processes that produced it. Explaining performance also requires consideration of the principles, training processes and contextual factors that shape those observable patterns.

Within the MTTP, this distinction is fundamental. The game model functions as the conceptual reference that guides practice design, whereas playing style represents one of its possible competitive expressions. Distinguishing the two provides the conceptual precision necessary for understanding how coaching intentions are progressively translated into team performance.

Dynamic and adaptive nature

A common misconception is to view the game model as a fixed tactical blueprint that should be reproduced consistently across all situations. Such an interpretation is difficult to reconcile with the dynamic and uncertain nature of football, where performance emerges from continuous interactions among players, opponents and contextual constraints. Any framework intended to guide team performance must therefore accommodate adaptation rather than suppress it.

The defining characteristic of the game model is precisely its capacity to balance stability and flexibility. Rather than prescribing specific solutions, it establishes principles that guide how players interpret and respond to evolving tactical problems. In this sense, the game model functions less as a script to be executed than as a reference that supports coordinated decision-making under changing conditions.

This distinction is fundamental because effective performance depends on both consistency and adaptability. Teams require shared principles that promote coordinated action, yet they must also remain capable of

responding to the variability inherent in competition. The game model provides this adaptive coherence by preserving a stable organisational logic while allowing different behavioural solutions to emerge according to situational demands.

This interpretation is consistent with ecological perspectives on performance, which conceptualise coordinated action as an emergent property of interactions among performers, tasks and environmental constraints (Araújo et al., 2006; Davids et al., 2013; Seifert et al., 2017). From this perspective, successful performance does not result from reproducing predetermined actions but from adapting effectively to continuously evolving situations. The role of the game model is therefore not to prescribe behaviour directly, but to shape the conditions under which functional patterns of play are more likely to emerge.

This perspective also explains why the same game model may generate different competitive expressions across teams, matches and contexts. A team committed to maintaining possession, for example, may rely on different passing structures, spatial relationships or movement solutions depending on the characteristics of the opposition and the evolving demands of the game. What remains stable is not the specific action, but the principles that guide it.

The same reasoning applies to training design. If successful performance depends on adaptation, practice should expose players to representative tactical problems rather than rehearsed solutions. Learning environments should therefore encourage exploration and adjustment while maintaining coherence with the team's intended way of playing. The objective is not to reproduce identical behaviours, but to develop players capable of adapting while remaining aligned with shared principles.

The game model should therefore be understood as a dynamic construct. Its strength lies not in eliminating variability but in channelling it towards coherent forms of team performance. This interpretation provides an essential conceptual foundation for the MTTP, in which learning and performance are viewed as products of continuous interaction between coaching intentions, practice design and player adaptation.

Team coordination and shared affordances

The effectiveness of a game model ultimately depends on its capacity to support team coordination. Regardless of how clearly its principles are defined, they acquire practical value only when players are able to coordinate their actions in ways that reflect the team's intended mode of play. Understanding the game model therefore requires moving beyond the description of tactical principles towards explaining the mechanisms through which coordinated performance emerges.

Contemporary ecological perspectives suggest that coordination does not result primarily from the execution of predefined tactical instructions but from the continuous interactions among players operating within dynamic performance environments (Duarte et al., 2012; Travassos et al., 2012; Davids et al., 2013; Silva et al., 2013). From this perspective, successful coordination depends on players adapting to evolving informational conditions while regulating their actions in relation to teammates and opponents.

The concept of shared affordances provides an important explanation for this process. Building on Gibson's (1979) notion of affordances as opportunities for action, ecological approaches recognise that many opportunities in team sports are inherently collective. Players must not only perceive possibilities for individual action but also recognise opportunities that depend upon coordinated responses among multiple teammates.

Within this framework, the game model shapes the informational landscape to which players progressively become attuned through training and competition. Repeated exposure to representative practice encourages the development of shared perceptions regarding when to press, provide support, create width, exploit space or accelerate attacking play. Rather than prescribing specific behaviours, the game model influences the conditions under which coordinated action is most likely to emerge.

This perspective offers an alternative to mechanistic interpretations of tactical organisation. Team coordination is understood not as the reproduction of predetermined patterns but as the adaptive regulation of collective action around shared informational opportunities. The game model therefore functions less as a set of instructions than as a framework that channels coordination towards the team's intended way of playing.

The development of shared affordances also highlights the importance of training design. Shared understanding cannot be established through verbal instruction alone; it develops through repeated engagement with representative tactical problems that require players to coordinate their actions under varying conditions. Training therefore plays a central role in shaping the perceptual and informational experiences that underpin coordinated performance.

This relationship is fundamental to the Model-to-Task Translation Process. The game model provides strategic direction, representative practice develops shared atonement to relevant affordances, and coordinated team performance emerges through continuous interaction with the learning environment. In this way, shared affordances provide the theoretical mechanism linking tactical organisation, practice design and collective adaptation within the framework proposed in this paper.

THEORETICAL AND METHODOLOGICAL FOUNDATIONS OF TRAINING DESIGN

Tactical periodization

Among contemporary approaches to football training, Tactical Periodization has been one of the most influential frameworks for linking tactical organisation with practice design. Originally developed by Vítor Frade and subsequently expanded by several coaches and scholars, it emerged as an alternative to reductionist models that treated physical, technical, tactical and psychological preparation as separate components of performance (Oliveira et al., 2006; Tamarit, 2013).

A central premise of Tactical Periodization is that the game should constitute the primary reference for all training decisions. Rather than organising practice around isolated physical or technical objectives, training is structured according to the principles that define the team's intended way of playing. Consequently, the game model provides the organising logic for session design, content selection and the sequencing of training throughout the competitive cycle.

This emphasis on the game model represents one of the framework's most important contributions. Tactical Periodization positions coherence between coaching intentions and practice design at the centre of the training process, viewing practice not as a collection of isolated exercises but as a systematic process through which players are repeatedly exposed to situations that reinforce the intended mode of play. Equally important is its interpretation of specificity, understood not simply as resemblance to competition but as the extent to which training tasks express the principles underpinning the game model.

Despite these strengths, Tactical Periodization provides comparatively limited explanation of the mechanisms through which players adapt within practice. Although it highlights the importance of task specificity and tactical coherence, it pays less attention to the informational processes through which players perceive opportunities, regulate their actions and coordinate with teammates under changing constraints. Consequently, the framework explains what should guide training more explicitly than how adaptive learning emerges.

This limitation does not diminish the value of Tactical Periodization. Rather, it highlights the opportunity for integration with ecological perspectives that offer more detailed accounts of learning, adaptation and constraint interaction. In the present paper, Tactical Periodization provides the foundation upon which the MTTP is built.

For the MTTP, Tactical Periodization therefore provides the strategic and methodological premise that training should be organised around the principles of the intended way of playing. The mechanisms through which players adapt to the resulting practice conditions require complementary explanatory perspectives.

Ecological dynamics

Over the past two decades, Ecological Dynamics has become one of the most influential theoretical perspectives for understanding learning, adaptation and performance in sport. Drawing on ecological psychology and dynamical systems theory, it conceptualises performance as an emergent product of continuous interactions between performers and their environment rather than the execution of internally stored motor programmes (Araújo et al., 2006; Davids et al., 2008, 2013).

A central assumption of the approach is that effective performance depends on athletes becoming increasingly attuned to the informational constraints that shape opportunities for action. Learning is therefore understood as a process of adaptation in which performers continuously perceive, interpret and respond to changing environmental conditions rather than reproducing predefined solutions (Araújo et al., 2006; Seifert et al., 2017).

This perspective has important implications for football. Team performance emerges through ongoing interactions among teammates, opponents and the surrounding performance environment, making coordination an adaptive process rather than the execution of fixed tactical scripts (Duarte et al., 2012; Travassos et al., 2012). From this viewpoint, successful play depends on players regulating their actions in response to shared informational conditions.

The concept of affordances provides the theoretical basis for this interpretation. Affordances represent opportunities for action that arise from the relationship between performers and their environment (Gibson, 1979). In football, these opportunities include passing lanes, pressing triggers, support options and exploitable spaces that continuously evolve during play. Learning therefore involves developing greater sensitivity to these opportunities and improving the capacity to act upon them under dynamic competitive conditions.

A further contribution of Ecological Dynamics lies in its interpretation of variability. Rather than treating variation as error, the approach views it as a functional property of adaptive performance. Practice should therefore encourage exploration, problem-solving and flexible responses instead of reinforcing invariant behavioural solutions.

Despite its explanatory power, Ecological Dynamics provides comparatively less guidance regarding the organisational principles that should orient learning. It offers a sophisticated account of how adaptation occurs but is less explicit about what should guide the design of training when coaches seek to develop a specific tactical identity.

For the MTTP, Ecological Dynamics provides an explanatory account of how adaptive and coordinated behaviours may emerge within practice. It does not, independently, determine the team-specific tactical principles towards which those adaptive processes should be oriented.

Constraints-led approach

The Constraints-Led Approach (CLA) has become one of the leading frameworks for understanding skill acquisition and practice design in sport. Grounded in ecological psychology and dynamical systems theory, it proposes that performance emerges through the interaction of performer, environmental and task constraints rather than through the reproduction of predefined movement solutions (Newell, 1986; Davids et al., 2008; Renshaw et al., 2019).

A central contribution of the CLA is its interpretation of constraints as functional influences on action. Rather than prescribing behaviour directly, constraints shape the opportunities available to performers, encouraging exploration and adaptation within specific performance contexts. Learning is therefore viewed as the progressive adjustment of perception and action to the demands created by these interacting constraints.

Within football, this perspective has important methodological implications. By manipulating variables such as player numbers, pitch dimensions, rules, scoring systems or spatial configurations, coaches modify the informational conditions experienced during practice. Training design thus becomes less concerned with prescribing solutions and more focused on creating situations in which functional solutions are likely to emerge.

The CLA also provides a compelling account of variability. Instead of treating variation as inconsistency or error, it regards it as a necessary characteristic of adaptive performance. Exposure to diverse task configurations encourages players to explore multiple solutions and develop greater flexibility in responding to changing competitive demands. From this perspective, learning is not the stabilisation of a single optimal response but the development of adaptable and context-sensitive performance capabilities.

Despite these strengths, the CLA is primarily concerned with explaining how practice conditions shape learning rather than how coaches should determine the tactical priorities that guide those conditions. It offers powerful methodological tools for manipulating practice but provides comparatively less guidance regarding the organisational principles that should inform those methodological decisions.

This distinction is particularly important in football, where practice is expected to support the development of a specific tactical identity. While the CLA explains how task manipulation influences learning, it does not specify how coaching intentions should be translated into the selection of appropriate constraints.

For the MTTP, the CLA provides the operational logic through which coaches may manipulate practice conditions. The selection of functionally appropriate constraints nevertheless requires a prior specification of the tactical problem and the game-model principle that the task is intended to develop.

Nonlinear pedagogy

Nonlinear Pedagogy (NLP) emerged as a pedagogical application of Ecological Dynamics and the CLA, providing a framework for designing practice that promotes exploration, adaptation and skill development (Chow et al., 2007; Chow et al., 2016; Chow et al., 2022). Rather than viewing learning as the linear transmission of knowledge or the reproduction of idealised movement patterns, NLP conceptualises it as a dynamic process through which performers adapt to the challenges and opportunities presented by their environment.

A central premise of NLP is that learning develops through engagement with representative performance problems rather than through the accumulation of technical knowledge or repetitive execution of prescribed solutions. Effective coaching therefore involves creating practice conditions that encourage players to perceive, decide and act while exploring functional solutions to evolving tactical problems.

This perspective is particularly relevant to football, where uncertainty, variability and continuous interaction define performance. Practice should therefore expose players to meaningful tactical challenges instead of merely rehearsing predetermined responses. Learning is enhanced not by oversimplifying performance demands but by designing tasks that preserve the informational characteristics of competition while remaining appropriate to players' developmental level.

One of the defining principles of NLP is Representative Learning Design (Pinder et al., 2011; Chow et al., 2016). Practice tasks should preserve the informational variables that specify opportunities for action during competition, allowing players to strengthen perception–action couplings that transfer effectively to match play. Representative practice therefore supports learning by maintaining the essential informational properties of the competitive environment.

Another key contribution concerns the educational role of exploration. Rather than directing performers towards a single optimal solution, NLP recognises that effective performance may emerge through multiple adaptive responses. Variability is therefore treated as a resource for learning rather than a source of error, encouraging players to discover solutions that remain functional under changing competitive conditions.

The framework also emphasises the importance of calibrating task difficulty. Practice should be sufficiently demanding to stimulate adaptation while remaining accessible enough to sustain engagement and exploration. In football, this balance is particularly important because excessive complexity may overwhelm performers, whereas oversimplified tasks may fail to preserve the informational demands that underpin meaningful learning.

Despite its considerable pedagogical value, NLP is primarily concerned with how practice should be designed rather than with the tactical priorities that should guide that design. Although it provides sophisticated principles for representative learning, exploration and skill adaptation, it offers comparatively limited guidance regarding how coaches determine the organisational priorities that shape practice.

For the MTTP, Nonlinear Pedagogy informs how learning opportunities may be designed, simplified and progressively adapted while preserving functional information. The tactical direction of this design must nevertheless be established through the team’s intended way of playing and the priorities derived from it.

Coaching pedagogy

Although contemporary approaches have substantially advanced the design of practice tasks and learning environments, effective coaching extends beyond task manipulation alone. Learning occurs within a social and pedagogical context in which coaches shape experiences, guide attention and influence how players engage with performance problems. Understanding training design therefore requires consideration not only of the practice environment but also of the pedagogical processes through which learning is facilitated.

Coaching Pedagogy provides an important framework for understanding this dimension of practice. Broadly defined, it concerns the processes through which coaches support learning, development and performance through their interactions with athletes (Jones, 2006; Cushion et al., 2003; Lyle & Cushion, 2017). Rather than treating coaching as the transmission of knowledge, contemporary perspectives emphasise learning as a relational process in which players actively construct understanding through engagement with tasks, teammates and coaches.

This perspective is particularly relevant in football, where performance depends on interpreting complex tactical situations rather than reproducing predetermined solutions. Coaches therefore influence learning not only through the design of practice but also through the way they intervene. Feedback, questioning, demonstrations and other pedagogical strategies shape players' attention, encourage reflection and support increasingly sophisticated tactical understanding.

Feedback illustrates this role particularly well. While direct instruction remains appropriate in specific situations, excessive prescription may reduce opportunities for exploration, decision-making and adaptation (Nelson et al., 2006; Cushion et al., 2003). Effective coaching therefore requires balancing guidance with opportunities for players to solve problems independently within representative practice contexts.

Questioning represents a complementary pedagogical strategy. By prompting players to reflect on their decisions and interactions, coaches encourage deeper tactical understanding and greater sensitivity to the informational cues embedded in performance. Learning thus becomes a process of guided discovery rather than passive instruction.

Coaching Pedagogy also extends beyond individual interventions. It encompasses the broader learning culture established by the coach, including the values, expectations and communication processes that shape how players engage with development. The effectiveness of practice therefore depends not only on the quality of task design but also on the pedagogical climate in which those tasks are experienced.

Despite the diversity of pedagogical approaches described in the coaching literature, a consistent principle is the alignment between instructional strategies and learning objectives. Feedback, questioning, demonstration and other interventions are most effective when they reinforce the tactical principles and developmental priorities that underpin practice. Pedagogical intervention should therefore be understood as an integral component of practice design rather than as a separate instructional layer.

For the MTTP, Coaching Pedagogy explains how coaches regulate attention, reflection and engagement within the learning environment. These interventions acquire methodological coherence when they are connected to the tactical problem embedded in the task rather than applied independently of its intended purpose.

Table 1. Comparative positioning of the MTTP and its theoretical and methodological foundations.

Perspective	Primary question	Principal contribution	Boundary regarding model-to-task translation	Function within the MTTP
Tactical Periodization	What should organise the training process?	Establishes the game model and its principles as the central reference for training specificity and weekly organisation.	Does not primarily explicate the perception–action mechanisms through which players adapt, nor provide explicit criteria for evaluating the alignment of individual tasks.	Provides strategic and methodological orientation.
Ecological Dynamics	How do skilled behaviours and collective coordination emerge?	Explains adaptation through performer–environment interactions, affordances, informational constraints and perception–action coupling.	Does not independently determine which team-specific tactical principles should guide the selection of practice problems.	Provides the explanatory account of adaptation and behavioural emergence.
Constraints-Led Approach	How can practice conditions be manipulated to support functional adaptation?	Provides a methodology for manipulating performer, task and environmental constraints without prescribing a single movement solution.	Does not, by itself, specify how constraints should be derived from a particular game model or tactical priority.	Provides the operational logic for task-constraint manipulation.
Nonlinear Pedagogy	How can representative and adaptive learning experiences be designed?	Provides pedagogical principles concerning representativeness, variability, exploration, task simplification and the calibration of task difficulty.	Does not primarily organise the preceding translation from coaching philosophy and game idea to team-specific training priorities.	Informs the design and progression of representative learning opportunities.
Coaching Pedagogy	How does the coach mediate learning through interaction?	Explains how feedback, questioning, observation, communication and the wider learning climate influence players' engagement and understanding.	Does not provide a complete architecture connecting strategic intentions, task design and the evaluation of emergent team behaviour.	Provides the pedagogical and relational regulation of the learning environment.
MTTP	How are coaching intentions translated into training tasks and evaluated through observable behaviour?	Organises the translation from coaching philosophy and game idea to game-model principles, training priorities, task constraints, learning environments and behavioural emergence.	Its proposed constructs, relationships and decision criteria require operationalisation and empirical validation.	Provides the integrative and recursive architecture connecting strategic orientation, practice design and performance evaluation.

Note. The perspectives are compared according to their primary analytical contribution, not as interchangeable or competing theories. The boundaries identified refer specifically to the model-to-task translation problem and should not be interpreted as general limitations of the respective perspectives. CLA = Constraints-Led Approach; MTTP = Model-to-Task Translation Process.

Comparative positioning and distinctive contribution of the MTTP

The perspectives reviewed above have made substantial but analytically distinct contributions to contemporary football coaching. Tactical Periodization establishes the intended way of playing as the principal reference for organising training. Ecological Dynamics explains how adaptive behaviour emerges through continuous interactions between players and their performance environment. The Constraints-Led Approach provides a methodological basis for manipulating practice conditions, Nonlinear Pedagogy informs the design of representative and adaptive learning experiences, and Coaching Pedagogy explains how

coaches mediate learning through interaction, observation and communication. These contributions are summarised in Table 1.

The perspectives should not be interpreted as directly equivalent or as competing explanations of the same phenomenon. They operate at different analytical levels and address different primary questions. Tactical Periodization is principally concerned with the strategic and methodological organisation of training; Ecological Dynamics provides a theoretical account of adaptation and coordination; the Constraints-Led Approach and Nonlinear Pedagogy inform practice design; and Coaching Pedagogy addresses the relational and educational processes through which coaches facilitate learning. Their relevance to the MTTP therefore lies in their differentiated functions rather than in their conceptual interchangeability.

Despite their respective contributions, a specific problem remains only partially articulated: how a coach moves systematically from an intended way of playing to the design and evaluation of an individual training task. Coaches may establish game-model principles, manipulate constraints, create representative activities and employ appropriate pedagogical interventions without possessing an explicit structure for determining how these decisions should be connected. Consequently, a task may be theoretically informed and game-like while remaining weakly connected to the tactical principle it is intended to develop.

The MTTP addresses this translational problem. Its proposed novelty does not reside in claiming ownership of the concepts of game model, affordances, constraints, representativeness or pedagogical intervention. Instead, it lies in assigning these concepts distinct functions within a common decision architecture. The framework identifies how strategic orientation is progressively specified as a game idea, formalised through game-model principles, filtered into training priorities, embedded in task constraints, experienced within learning environments and examined through observable behavioural emergence.

This architecture introduces a vertical dimension of coherence that extends beyond either tactical specificity or representative learning considered separately. Vertical coherence refers to the traceable correspondence between a coaching intention, the game-model principle derived from it, the tactical problem selected for development, the constraints used to shape that problem and the behaviours available for observation. A task is therefore not considered methodologically coherent solely because it resembles competition or elicits intensive player involvement. Its value depends on whether its design creates meaningful opportunities to perceive and act upon the tactical problem associated with the intended principle.

A second distinctive contribution is the separation of model–task alignment from representativeness. Model–task alignment concerns the extent to which a practice task creates opportunities to develop a specified game-model principle. Representativeness concerns the extent to which the task preserves the informational variables, action possibilities and perception–action relationships that regulate behaviour in competition. The dimensions are complementary but not interchangeable. A task may closely resemble match play while generating few opportunities to develop the intended principle; conversely, a simplified activity may be strongly aligned with a tactical priority while preserving only part of the information available in competition. Distinguishing these dimensions enables a more precise evaluation of task functionality.

A third contribution concerns the recursive nature of the proposed process. The MTTP does not end with task implementation. Behaviour observed during training and competition provides evidence regarding whether the intended tactical problems were encountered, whether functional solutions emerged and whether the relationships among game-model principles, training priorities and task constraints require adjustment.

Translation is therefore conceptualised as a continuing cycle of specification, design, observation and recalibration rather than as the linear implementation of a predetermined tactical plan.

Accordingly, the MTTP occupies a translational level that is not fully addressed by any of its contributing perspectives in isolation. It does not replace their explanatory or methodological functions and should not be interpreted as theoretically superior to them. Its contribution is to connect those functions around a specific coaching problem: establishing a traceable and examinable relationship between the way a team intends to play, the learning opportunities designed in training and the behaviours that emerge in practice and competition.

This positioning also defines the limits of the framework's claims. The MTTP currently proposes a conceptual architecture rather than an empirically validated account of causal relationships. Whether greater vertical coherence or stronger model–task alignment contributes to behavioural development and transfer remains an empirical question. By defining the relevant constructs and their proposed relationships, however, the framework makes this question more explicit and provides a basis for systematic investigation.

Theoretical compatibility, tensions and limits of integration

The integration proposed within the MTTP does not imply that Tactical Periodization, Ecological Dynamics, the Constraints-Led Approach, Nonlinear Pedagogy and Coaching Pedagogy share identical epistemological assumptions. These perspectives emerged from different theoretical and methodological traditions, operate at different levels of analysis and assign different roles to coaching intention, environmental information, prescription and behavioural emergence. Their inclusion within a common framework therefore requires explicit recognition of both their functional complementarity and their conceptual tensions.

A central tension concerns the relationship between strategic direction and behavioural emergence. Game-model approaches begin with an intended way of playing and organise training around principles selected by the coach. Ecological Dynamics, by contrast, explains behaviour as emerging through continuous performer–environment interactions rather than through the execution of internally prescribed solutions. If the game model is interpreted as a detailed representation of predetermined actions, its prescriptive logic would conflict with an ecological account of adaptive behaviour. Within the MTTP, this tension is addressed by conceptualising the game model as a set of functional principles and shared orientation criteria rather than as a fixed behavioural script. The game model specifies the problems to be addressed and the functions to be fulfilled, but it does not determine the exact solutions through which players must satisfy them.

A related tension concerns the coach's manipulation of task constraints. Constraints are deliberately selected to increase the likelihood that players encounter particular tactical problems, yet the behaviours that emerge from those conditions cannot be fully predicted or controlled. The MTTP therefore distinguishes between designing for an intended behaviour and prescribing its precise form. Coaches may manipulate space, player numbers, rules, scoring conditions or starting positions to privilege relevant information and action possibilities, but players must retain meaningful opportunities to perceive, decide and adapt. Task constraints should channel exploration towards a tactical purpose without reducing the activity to the reproduction of a predetermined response.

Specificity and representativeness create a further conceptual trade-off. Within game-model approaches, specificity primarily concerns coherence with the team's intended way of playing. Within ecological approaches, representativeness concerns the preservation of information and perception–action relations that regulate competitive behaviour. These criteria may converge, but they are not equivalent. A task may be

closely aligned with a game-model principle while simplifying important sources of competitive information. Conversely, a task may preserve many features of match play while providing insufficient opportunities to develop the selected tactical priority. The MTTP does not resolve this tension by assuming that every task should maximise both dimensions. Instead, it treats alignment and representativeness as separate design criteria whose relative weighting depends on the learning objective, player characteristics and stage of development.

The role of pedagogical intervention also requires qualification. Coaching Pedagogy recognises the importance of explanation, feedback, questioning and guided reflection, whereas ecological approaches caution that excessive verbal prescription may disrupt exploration or direct attention towards information that is not functionally relevant. Within the MTTP, pedagogical intervention is therefore neither eliminated nor treated as the primary cause of learning. Its function is to support players 'engagement with the tactical problem, guide attention when necessary and facilitate reflection on emerging solutions. The form, timing and frequency of intervention should be adapted to the task, the players 'needs and the information already available within the learning environment.

These tensions establish clear boundaries for theoretical integration. Compatibility is strengthened when the game model provides functional direction without prescribing invariant actions; when constraints create opportunities without predetermining solutions; when pedagogical intervention guides attention without replacing perception and decision-making; and when behavioural variability is evaluated according to its functionality rather than its conformity to an idealised movement pattern. Compatibility becomes weaker when the game model is treated as a rigid script, task constraints are used to compel a single response, or coaching intervention suppresses the adaptive exploration required by changing performance conditions.

The MTTP therefore adopts a position of conditional functional integration. Tactical Periodization contributes strategic direction; Ecological Dynamics provides an account of adaptive emergence; the Constraints-Led Approach and Nonlinear Pedagogy inform the design of practice conditions; and Coaching Pedagogy addresses the mediation of learning through coach–player interaction. These contributions can be articulated because they address different functions within the model-to-task translation process, but their theoretical differences should not be erased. The coherence of the MTTP depends precisely on preserving those differences while specifying the conditions under which their contributions can operate together.

This position also limits the claims that can be made for the framework. The MTTP does not propose a unified theory derived from the complete epistemological reconciliation of its contributing perspectives. It proposes a translational framework in which selected and explicitly delimited contributions are organised around a shared practical problem. The adequacy of this integration, including the conditions under which strategic direction supports or constrains adaptive learning, remains open to conceptual refinement and empirical investigation.

THE MODEL-TO-TASK TRANSLATION PROCESS

The Model-to-Task Translation Process is proposed as an integrative conceptual and decision-guiding framework for organising the translation of coaching intentions into practice. Its purpose is not to prescribe a universal training method, but to clarify the distinct decisions and relationships through which an intended way of playing may inform training priorities, task design, learning environments and the observation of team behaviour.

The MTTP comprises a sequence of analytically distinguishable but dynamically interdependent components: coaching philosophy, game idea, game model, training priorities, task constraints, learning environments and behavioural emergence. These components should not be interpreted as a rigid linear chain. The framework represents a recursive process in which decisions made at one level constrain—but do not determine—the possibilities available at subsequent levels, while evidence emerging from training and competition may lead to the reconsideration of earlier decisions.

The framework therefore combines strategic direction with adaptive emergence. Coaching philosophy, game idea and game-model principles specify the intended direction of development; training priorities and task constraints translate that direction into practice conditions; learning environments provide opportunities for perception, action and interaction; and behavioural emergence constitutes the observable, context-dependent expression of players 'adaptations. The quality of the translation process depends on the coherence among these components rather than on the isolated methodological value of any single exercise.

As established in Section 3.7, this integration is conditional rather than absolute. Strategic direction, constraint manipulation, pedagogical intervention and behavioural emergence remain conceptually distinct within the MTTP. Their articulation depends on preserving adaptive degrees of freedom: the coach may specify the intended tactical function and design conditions that privilege relevant opportunities for action, but the precise behavioural solution remains contingent on player–environment interaction.

Table 2. Constructs, functions and outputs within the Model-to-Task Translation Process.

MTTP component	Definition	Specific function	Primary output	Football example
Coaching philosophy	The relatively enduring beliefs and values through which the coach interprets football, learning, leadership and player development.	Establishes the normative and pedagogical foundations of the coaching process.	Broad criteria for deciding what is valued and how players should be developed.	Valuing proactive play, collective responsibility and adaptive decision-making.
Game idea	The coach's context-sensitive strategic conception of how the team should approach the game.	Converts general beliefs into an intended football identity and broad strategic orientation.	An overarching conception of the intended way of playing.	Seeking to control the game through territorial initiative, rapid ball recovery and purposeful possession.
Game model	A dynamic and hierarchically organised system of principles and subprinciples intended to guide collective behaviour.	Specifies the functional principles through which the game idea can be expressed across moments of play.	Game-model principles and subprinciples.	Directing the opponent's build-up towards the touchline before initiating coordinated pressure.
Training priorities	The contextually selected tactical problems or developmental emphases derived from the game model for a defined period or session.	Filters the breadth of the game model into a manageable focus for learning and practice design.	A clearly delimited tactical problem and associated learning intention.	Coordinating the winger's pressing trigger with the striker's cover of the inside passing lane.
Task constraints	The practice conditions deliberately manipulated to shape available information, action possibilities and player interactions.	Operationalises the training priority by increasing the likelihood that players encounter and explore the intended tactical problem.	A task configuration specifying space, numbers, rules, objectives, restarts and scoring conditions.	Requiring build-up to begin through the opposing centre-backs and awarding additional points for regaining possession in a wide pressing zone.

Learning environment	The dynamic experiential context emerging from the interaction among players, task constraints, available information, pedagogical intervention and wider contextual conditions.	Provides the situated opportunities through which players perceive, decide, coordinate and adapt.	Experienced tactical problems, information–action relationships and opportunities for exploration.	Repeated exposure to variable opposition build-up patterns requiring coordinated pressing decisions under active resistance.
Behavioural emergence	The context-dependent appearance and development of individual and collective behavioural tendencies during training and competition.	Provides observable evidence for evaluating the effects and coherence of the translation process.	Behavioural patterns and performance indicators that may confirm, qualify or challenge the initial design assumptions.	Increasing synchronisation among winger, striker and full-back while preserving adaptation to different opposition movements.

Note. The components are analytically distinguishable but dynamically interdependent. Output" refers to the principal product of each stage for the subsequent translation process and does not imply a fixed or deterministic causal sequence. MTTP = Model-to-Task Translation Process.

Coaching philosophy

Within the MTTP, coaching philosophy constitutes the foundational level of the translation process. It refers to the beliefs, values and assumptions through which coaches interpret football, player development and their own professional role (Jones, 2006; Cushion et al., 2003; Lyle & Cushion, 2017). These commitments influence how performance problems are understood, which developmental outcomes are valued and how authority, feedback and player autonomy are negotiated.

Its function within the framework is generative rather than operational. Coaching philosophy does not directly specify tactical behaviours or task conditions; instead, it provides the criteria from which strategic preferences and pedagogical orientations are formed. Philosophical commitments concerning collective organisation, adaptability or player agency may therefore shape both the intended way of playing and the manner in which players are supported in developing it.

This position establishes the first requirement of vertical coherence within the MTTP: subsequent strategic, methodological and pedagogical decisions should remain interpretable in relation to the beliefs that initially give them direction, without assuming that philosophy determines those decisions in a fixed or linear manner. Inconsistency may arise, for example, when a coach endorses player autonomy but systematically uses highly prescriptive tasks and interventions that restrict opportunities for perception, decision-making and exploration.

Although relatively enduring, coaching philosophy may be revised through experience, reflection and contextual change. This capacity for development does not diminish its foundational role; rather, it indicates that the starting point of the MTTP is itself open to professional learning. Its principal output for the subsequent stage is a sufficiently explicit set of beliefs from which a context-sensitive game idea can be constructed.

Game idea

The game idea represents the first context-sensitive strategic expression of coaching philosophy. It articulates an overarching conception of how the team should approach the game, including broad intentions such as controlling territory, recovering possession rapidly, exploiting transitions or sustaining purposeful possession. These intentions provide direction but do not yet specify the principles through which players should coordinate their actions in particular tactical situations.

Its function within the MTTP is therefore orientational. The game idea converts general beliefs into a recognisable football identity while preserving the distinction between strategic intention and operational organisation. This distinction is important because statements such as "*press aggressively*" or "*control possession*" communicate a preferred direction but remain insufficient for designing practice until the tactical problems and functional relationships contained within them are made explicit.

The game idea is shaped not only by coaching philosophy but also by player characteristics, competitive demands, club culture and available resources. Similar philosophical positions may consequently produce different strategic orientations in different contexts, while a coach may adapt the expression of a game idea without abandoning the beliefs on which it is founded. The construct should therefore be regarded as context sensitive and revisable rather than as a fixed declaration of tactical identity.

Its principal output is an overarching and contextually feasible conception of the intended way of playing. To inform collective behaviour and practice design, however, this strategic conception must be translated into more explicit functional principles and subprinciples. That translation defines the organisational role of the game model within the MTTP.

Game model

Within the MTTP, the game model occupies the principal organisational position between strategic intention and practice design. It is understood as a dynamic and hierarchically organised system of principles and subprinciples intended to guide collective behaviour across the different moments of play (Castelo, 1994, 2009; Garganta, 1997, 2009; Plakias, 2023). Its specific function is to translate the game idea into functional references from which contextually relevant training priorities can be selected.

Game-model principles specify the tactical problems the team is intended to solve and the functional relationships through which collective coordination may be achieved. They may define, for example, how space should be managed, how pressure should be coordinated or how numerical and positional advantages should be created. These principles provide direction without prescribing invariant actions: their purpose is to channel perception and coordination while preserving players' capacity to adapt to opponents, teammates and changing competitive conditions.

The game model should therefore neither be reduced to a description of observed playing style nor treated as a predetermined tactical script. It establishes an intended organisational logic, whereas its behavioural expression remains context dependent and may include multiple functional solutions (Araújo et al., 2006; Davids et al., 2013; Seifert et al., 2017). This distinction reconciles strategic direction with adaptive performance: the game model identifies what collective functions should be developed without predetermining the precise actions through which players must express them.

The principal output of this stage is an explicit and hierarchically organised set of game-model principles. These principles are not themselves training priorities or task constraints. They express relatively enduring functional intentions concerning collective play; training priorities identify which tactical problem requires particular attention within a defined period; and task constraints subsequently configure the practice conditions through which players may engage with that problem. Because the entire game model cannot be addressed simultaneously, its principles must be filtered according to observed performance, developmental needs and contextual demands. This selection produces the training priorities examined in the following subsection.

Training priorities

The game model may contain multiple principles and subprinciples across different moments of play, but these cannot all receive equal emphasis within every session or training period. Within the MTTP, training priorities are the contextually selected tactical problems or developmental emphases derived from the game model for a defined period of practice. Their function is to filter the breadth and complexity of the game model into a manageable focus capable of guiding task design.

The distinction between game-model principles and training priorities concerns both stability and function. Game-model principles express relatively enduring intentions regarding how the team seeks to organise collective play. Training priorities identify which aspect of those intentions requires particular developmental attention at a given moment. A principle may therefore remain stable while its priority changes according to observed performance, player development, the stage of the season, forthcoming competitive demands or evidence of learning.

Training priorities should be formulated as tactical problems rather than as decontextualised technical actions or predetermined behavioural solutions. For example, a game-model principle may seek to direct the opponent's build-up towards the touchline before initiating collective pressure. A corresponding training priority might focus on coordinating the winger's pressing trigger with the striker's protection of the inside passing lane and the full-back's control of the wide receiving option. This formulation specifies the functional problem that practice should repeatedly make available without prescribing the precise movements through which players must solve it.

A training priority should therefore identify the game-model principle being developed, the tactical problem that players are expected to recognise and solve, and the functional relationships that should become available for observation. General objectives such as improving passing, increasing intensity or developing communication are insufficient unless their intended tactical function is made explicit. Within the MTTP, the priority defines why a particular focus is relevant to the intended way of playing.

Priority selection also connects performance analysis with intervention. Evidence from training and competition may indicate that a game-model principle is absent, unstable, poorly coordinated or insufficiently adaptable. The coach must then determine which aspect of that principle requires focused attention and the level of complexity at which it should be addressed. Selection is therefore not a mechanical deduction from the game model, but a contextual judgement informed by observation, developmental needs and the wider training process.

A training priority does not yet constitute a practice task. It defines the intended learning focus but not the conditions through which players will experience it. Different tasks may address the same priority, and the same task format may serve different priorities depending on how its constraints are configured. Once the priority has been established, it must therefore be operationalised through practice conditions that create meaningful opportunities for players to engage with the relevant tactical problem. Within the MTTP, these deliberately manipulated conditions are defined as task constraints.

Task constraints

Once a training priority has been established, the next decision concerns how the corresponding tactical problem will be made available to players in practice. Within the MTTP, task constraints refer specifically to the practice conditions deliberately configured by the coach to shape available information, action possibilities

and player interactions. They constitute the operational means through which a training priority is embedded in task design; they are not themselves the intended learning content.

The concept of constraints occupies a central position in contemporary theories of learning and performance. From the perspective of the CLA, behaviour emerges through the interaction of performer, environmental and task constraints (Newell, 1986; Davids et al., 2008; Renshaw et al., 2019). The MTTP focuses at this stage on task constraints because these are especially amenable to deliberate coaching intervention. Their manipulation may influence the opportunities encountered by players, but it does not determine the responses that will emerge.

In football, task constraints include pitch dimensions, numerical configurations, playing rules, scoring conditions, target areas, restart locations, temporal demands and task objectives. These variables function as an interacting configuration rather than as isolated design elements. Altering playing space, for example, may change interpersonal distances, pressure time, available passing lanes and the functional effects of numerical relations. Task design therefore requires consideration of how multiple constraints combine to amplify, reduce or transform the tactical problem experienced by players.

The distinction between a training priority and a task constraint concerns function rather than surface content. "*Protecting the central corridor while directing the opponent towards the touchline*" describes the tactical problem to be developed and therefore constitutes a training priority. A rule requiring the attacking team to initiate build-up through a defined central area or awarding additional points for regaining possession in a wide pressing zone, constitutes a task constraint because it configures the conditions through which that problem becomes available. Confusing these levels obscures the difference between the purpose of practice and the means used to pursue it.

The functionality of task constraints depends on both model–task alignment and representativeness. Constraints should create recurring opportunities to engage with the selected tactical problem while preserving, to an appropriate degree, the information and perception–action relationships that regulate performance in competition. Simplification may be useful when it foregrounds a problem that players are not yet able to manage under full complexity, but its developmental value depends on subsequent progression towards more representative conditions. Conversely, an activity may closely resemble competition while remaining poorly aligned if its constraints predominantly invite behaviours unrelated to the selected priority.

Task constraints consequently describe what the coach deliberately designs, but not the totality of what players experience. The resulting learning environment emerges only when these conditions interact with players 'capabilities, intentions and previous experiences, the behaviour of teammates and opponents, the information available during activity and the coach's pedagogical intervention. This distinction establishes the transition from configured task conditions to the experiential context examined in the following subsection.

Learning environments

Within the MTTP, the learning environment is the dynamic experiential context that emerges from the interaction among players, task constraints, available information, pedagogical intervention and wider contextual conditions. Whereas task constraints refer to the conditions deliberately configured by the coach, the learning environment concerns the opportunities and interactions that become available as players engage with those conditions. It therefore cannot be reduced to the formal structure of the task or fully specified in advance.

This distinction is essential because task design alone does not determine what players perceive, explore or learn. Two activities with identical formal constraints may generate different learning environments because player expertise, fatigue, motivation, interpersonal relationships, opposition behaviour, previous experience and coaching intervention alter the information available and the possibilities for action. Conversely, different task configurations may create functionally comparable opportunities when they preserve the same tactical problem and relevant information–action relationships.

From an ecological perspective, learning environments are dynamic systems in which informational, social and tactical influences continuously interact (Araújo et al., 2006; Davids et al., 2013; Chow et al., 2016). Players adapt their actions through their ongoing relationships with teammates, opponents, space, time and task objectives. Effective environments should therefore preserve, to a degree appropriate to the developmental purpose, the information that regulates performance in competition. Representative Learning Design emphasises the importance of maintaining relevant perception–action relationships so that practice supports atonement to competition-relevant opportunities for action (Pinder et al., 2011; Woods et al., 2020).

Representativeness does not, however, establish whether an environment serves the selected game-model principle. A practice activity may preserve substantial competition-relevant information while predominantly inviting behaviours unrelated to the training priority. Conversely, a highly aligned but extensively simplified activity may foreground the intended tactical problem while temporarily removing information required for transfer. The functionality of the learning environment therefore depends on the relationship between alignment, representativeness, player readiness and the position of the activity within a broader task progression.

Pedagogical intervention forms part of this environment rather than operating outside it. Feedback, questioning, attentional guidance and task adjustment may support players' engagement with the tactical problem, but their effects depend on timing, content and compatibility with the information available in the activity. Intervention should clarify purpose or redirect attention when necessary without replacing players' perception and decision-making or prescribing an invariant solution.

The quality of a learning environment should not be inferred solely from immediate task performance. Successful execution may reflect familiarity, repeated instruction or temporary adaptation to a particular activity, whereas exploration and short-term inconsistency may accompany productive engagement with a demanding tactical problem. Evaluation should therefore consider the opportunities made available, the behaviours observed across repeated exposures and their subsequent stability, adaptability and transfer. Within the MTTP, the learning environment provides the situated conditions from which behavioural tendencies may emerge; those tendencies constitute evidence for evaluating, rather than proof of, the effectiveness of the preceding translation decisions.

Behavioural emergence

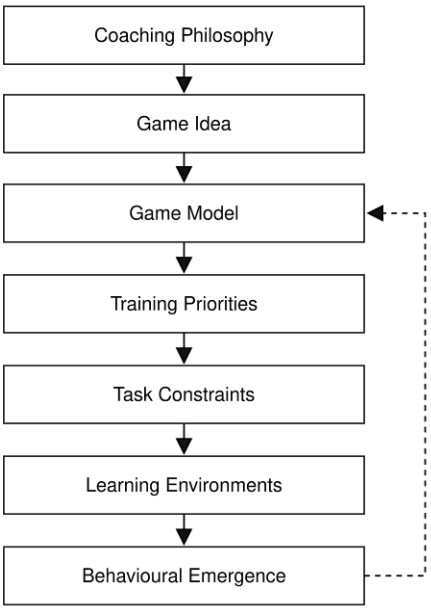
The observable component of the MTTP concerns behavioural emergence: the context-dependent appearance and development of individual and collective behavioural tendencies during training and competition. These tendencies may become functionally consistent with the selected game-model principle, but they should not be interpreted as its direct or predetermined expression. They emerge through the interaction of players, task conditions, available information, pedagogical influences and the wider performance context (Araújo et al., 2006; Davids et al., 2013; Seifert et al., 2017).

Behavioural emergence may be examined through patterns such as team compactness, pressing coordination, positional rotations, support relationships, spatial occupation and responses to transitions. The relevant indicators should be derived from the game-model principle and training priority established earlier in the process. For a priority concerning coordinated wide pressing, for example, observation might focus on the synchronisation of the winger's approach, the striker's protection of the inside passing lane, the full-back's control of the wide receiver and the collective response when the opponent changes the direction of play.

Observed behaviour must nevertheless be interpreted in relation to the opportunities generated by the task. The absence of an intended response is informative only when the corresponding tactical problem was available, while the occurrence of an apparently appropriate action provides limited evidence if it resulted from an atypical event, an opponent's unforced error or a task condition that removed the need for perception and decision-making. Evaluation should therefore consider not only whether a behaviour occurred, but also the informational and interactional conditions under which it emerged.

Nor should the appearance of an intended behaviour during a single activity be treated as evidence of learning or transfer. Stronger evidence requires repeated observation across varying task conditions and, ultimately, examination of whether the behavioural tendency remains stable, adaptable and functionally effective in competition. Within the MTTP, behavioural emergence provides evidence with which the coherence and effects of previous decisions may be evaluated; it does not, by itself, validate those decisions or establish a causal relationship between task design and learning.

This evidence also supports the recursive regulation of the translation process. Behavioural observations may indicate that task constraints require adjustment, that a training priority should be maintained or progressed, or that the underlying game-model principle requires reconsideration. Feedback therefore operates across different timescales: immediate observations may inform task modification, recurring tendencies may influence subsequent training priorities, and evidence accumulated across training and competition may contribute to the longer-term refinement of the game model.



Note. Solid arrows represent the translation process; the dashed arrow represents feedback from behavioural emergence to the game model.

Figure 1. The Model-to-Task Translation Process (MTTP).

Figure 1 summarises the MTTP and illustrates the recursive relationships linking coaching philosophy, game idea, game model, training priorities, task constraints, learning environments and behavioural emergence.

PRACTICAL APPLICATIONS FOR FOOTBALL TRAINING DESIGN

From training priority to coherent task design

The practical application of the MTTP begins with the definition of a training priority rather than the selection of an exercise. Coaches must first identify the game-model principle to be developed, determine the tactical problem requiring attention and specify the functional relationships that practice should make available. Task selection and design follow from these decisions.

A training task has no inherent methodological value. Its relevance depends on whether its constraints repeatedly create opportunities for players to engage with the intended tactical problem. Activities with similar formats may serve different purposes, whereas structurally different tasks may address the same priority. Task quality should therefore be evaluated through the functional relationship between the selected priority, the information available to players and the interactions that the activity generates.

Constraints such as playing space, numerical relations, rules, scoring conditions, restart locations and temporal demands provide the principal means of embedding a training priority in practice. Their manipulation should privilege relevant opportunities for action without predetermining the solutions players must adopt. Coherence with the game model concerns the function of the behaviour being developed, not the reproduction of fixed movements or tactical scripts.

Session design also requires purposeful sequencing. Practice may initially reduce complexity to increase engagement with a tactical problem and then progressively restore information, variability and opposition pressure. Activities need not share the same format, but they should maintain a traceable relationship with the session priority. Variation is methodologically coherent when it exposes players to complementary expressions of the same problem rather than introducing unrelated content.

Pedagogical intervention should preserve this direction. Feedback, questioning and task adjustments are most useful when they guide attention towards information relevant to the tactical problem while retaining opportunities for perception, decision-making and exploration. Intervention should clarify the intended function without imposing an invariant behavioural form.

Coherent task design is therefore not achieved by selecting exercises that merely resemble competition. It depends on whether the intended tactical problem is available, whether players engage with competition-relevant information and whether the behaviours observed provide evidence for maintaining, progressing or recalibrating the activity. The following applied case illustrates this translation from strategic intention to task design and evaluation.

Applied case: Translating coordinated high pressing into practice

The MTTP described above can be illustrated through a team seeking to develop coordinated high pressing against an opponent's build-up from the goalkeeper. The example does not prescribe a universal pressing strategy or training activity; it demonstrates how successive decisions may remain traceable while preserving players 'opportunities to perceive, decide and adapt.

Consider a senior team organised predominantly in a 1–4–3–3 formation. The coach's philosophy values proactive play, collective responsibility and the capacity to influence the opponent rather than respond passively. This orientation informs a game idea based on recovering possession early, restricting central progression and using collective pressure to maintain territorial initiative. These intentions remain too broad to guide an individual training task and must therefore be specified through the game model.

Within the game model, one principle establishes that the team should protect central progression while directing the opponent's build-up towards the touchline. A related subprinciple specifies that a pass from an opposing centre-back to the full-back functions as a potential pressing trigger. The intended collective response involves the ball-side winger pressing from an inside-to-outside trajectory, the striker restricting the return pass and access to the nearest pivot, the ball-side midfielder protecting the inside progression route, and the full-back advancing to control the wide receiving option. The remaining players adjust their positions to preserve compactness, defensive cover and protection against direct progression.

The game-model principle does not automatically determine the immediate content of training. Analysis of recent training and match performance may reveal, for example, that the winger initiates pressure but the supporting movements occur too late, allowing opponents to escape through the inside passing lane. The training priority is therefore formulated more specifically: to improve the temporal coordination of the winger, striker, ball-side midfielder and full-back when the opponent circulates the ball from a centre-back towards the touchline. Table 3 summarises the complete translation pathway.

Table 3. Applied translation of coordinated high pressing through the MTTP.

MTTP component	Application to the case
Coaching philosophy	Promote proactive, collectively responsible and adaptable play.
Game idea	Recover possession early, restrict central progression and sustain territorial initiative.
Game-model principle	Protect the centre and direct the opponent's build-up towards the touchline before applying coordinated pressure.
Game-model subprinciple	Treat the pass from centre-back to full-back as a potential pressing trigger, provided that supporting positions enable collective pressure.
Training priority	Improve the temporal and spatial coordination of the winger, striker, ball-side midfielder and full-back during wide pressing.
Task constraints	Recurrent build-up from the goalkeeper; active opposition; directional play; pitch dimensions preserving central and wide progression; scoring incentives for successful progression and high regains; variable build-up solutions.
Learning environment	Repeated but non-identical opportunities to detect pressing triggers, coordinate supporting actions and adapt to different opponent responses under representative informational conditions.
Pedagogical intervention	Brief questioning, guided attention and task adjustment focused on the relationships among the pressing players rather than prescribing identical movements.
Behavioural indicators	Direction of opposition progression, response to the pressing trigger, protection of central access, synchronisation of supporting movements, collective compactness and the outcome of the pressing sequence.
Feedback and recalibration	Observed behaviours inform subsequent adjustments to the priority, task constraints, intervention or relevant game-model subprinciple.

Note. The example illustrates one context-specific application and should not be interpreted as a universal pressing model or standardised training prescription. MTTP = Model-to-Task Translation Process.

A possible practice activity involves two teams of eight outfield players and two goalkeepers on an approximately 65 × 52 m playing area, adjusted according to player level and the physical and informational demands intended by the coach. The team selected to develop high pressing is organised with a front three, two midfielders and three covering players. The opposition is organised to reproduce the principal

relationships of build-up play, including central defenders, full-backs, midfield support and advanced targets. The numerical configuration is not intended to reproduce the full match structure but to preserve the relationships most relevant to the targeted pressing problem.

Each sequence begins with the opposition goalkeeper, ensuring repeated exposure to the build-up phase without predetermining where the ball must be played. The team in possession attempts to progress through controlled possession and score in the opposing goal. The pressing team plays normally after regaining possession, but an additional reward may be attributed to goals scored shortly after a regain in the attacking sector. This incentive gives functional value to high recovery without requiring players to press in every situation irrespective of the conditions available.

The playing area should preserve sufficient width for the opposition to use central and wide progression routes. Marked lateral reference channels may initially help the coach and players identify where pressing situations occur, but they should not oblige the opposition to play wide or require defenders to remain within predetermined zones. If the task guarantees the desired pass or fixes every subsequent movement, players may reproduce the external form of pressing without learning to detect whether the relevant informational conditions are present.

The opposition should therefore be encouraged to vary its build-up. It may circulate between centre-backs, use the goalkeeper to change the point of attack, connect with a supporting midfielder, progress through the full-back or play directly towards an advanced player. This variability is essential because the pressing team must learn to distinguish between situations in which collective pressure is functionally available and situations in which delaying, adjusting or reorganising is more appropriate.

Task constraints are selected according to their function. Recurrent restarts from the goalkeeper increase the availability of the targeted problem. Directional play preserves the relationship between pressure, territorial progression and goal protection. Active opposition maintains representative perception–action demands. The pitch dimensions regulate the time and space available for circulation, pressure and defensive cover. Scoring incentives increase the value of high regains and successful opposition progression without prescribing the precise actions through which either team must achieve them.

These constraints operationalise the training priority, but they do not constitute the learning environment in isolation. The environment emerges as players interact with the task, interpret the movements of teammates and opponents, detect or fail to detect pressing opportunities, and adapt their positioning across successive sequences. Its quality depends on whether the activity repeatedly generates the intended tactical problem while preserving enough variability for players to explore different functional solutions.

Pedagogical intervention should focus on the relationships that support collective pressure rather than on prescribing a fixed movement sequence. During brief pauses, the coach might ask: What information indicated that pressure could be initiated? Which passing option had to be removed before the winger advanced? What allowed the opponent to escape inside? How did the position of the ball-side midfielder affect the full-back's decision? Such questions direct attention towards functionally relevant information while allowing players to reconstruct the solution from their experience.

Direct feedback may be appropriate when the tactical function is unclear or when a recurring coordination problem prevents meaningful engagement with the task. Even in these situations, feedback should distinguish the intended function from its possible behavioural forms. The requirement to restrict central

progression may remain stable, while the precise distances, angles and timing through which players achieve it vary according to ball speed, opponent positioning and the movements of teammates.

The coach may evaluate the activity through opportunity, process and outcome indicators. Opportunity indicators establish whether the task generated a sufficient number of relevant pressing situations. Process indicators examine whether players recognised the trigger, protected central access and synchronised supporting movements. Outcome indicators record whether the opponent was forced backwards, directed into a less advantageous action, compelled to play long, dispossessed in an advanced area or able to escape pressure. This distinction is necessary because a successful ball recovery may result from an opponent's technical error, while a well-coordinated pressing action may not result in possession being regained.

Evidence from the activity should inform subsequent decisions. If few relevant situations occur, the task constraints may require adjustment. If the winger consistently initiates pressure before central access is protected, the training priority or pedagogical intervention may need greater emphasis on the preparatory relationships. If the opposition can no longer create meaningful variation, the task may have become too predictable and should be progressed. If coordination stabilises only under simplified conditions, representativeness may need to increase gradually before transfer to competition can be reasonably examined.

The recursive feedback represented in Figure 1 becomes operational in this process. Observed behaviour does not merely indicate whether the players complied with the coach's instructions. It provides evidence concerning the adequacy of the original translation: whether the training priority captured the relevant performance problem, whether the task constraints made that problem available, whether the learning environment supported adaptive engagement and whether the game-model subprinciple was defined with sufficient functional clarity.

Across subsequent sessions, the task format may change while the developmental direction remains coherent. The same priority may be explored through larger numerical configurations, different opposition structures or practice closer to full match conditions. Conversely, the same task format may be retained but redesigned to address a different priority. Model coherence therefore resides in the traceable relationship among intention, tactical problem, task design and behavioural evaluation, not in the repeated use of a particular exercise.

This example illustrates the practical function of the MTTP. The framework does not determine which pressing model a coach should adopt or guarantee that the intended behaviour will emerge. It provides a structure for making the reasoning behind practice design explicit, evaluating whether the intended tactical problem was meaningfully represented and using observed behaviour to recalibrate subsequent decisions.

Monitoring and recursive recalibration

Monitoring within the MTTP is intended to determine whether the translation from training priority to task design is functioning as proposed and what subsequent adjustment, if any, is warranted. Before implementation, coaches should specify the tactical problem to be observed, the conditions under which opportunities to address it are expected to occur and the behavioural relationships that would provide relevant evidence. This prospective definition reduces the risk of evaluating an activity only through its most visible or successful outcomes.

Observation should distinguish among opportunity, process and outcome indicators. Opportunity indicators establish whether the task generated the situations required for the selected tactical problem to become available. Process indicators examine how players perceived and coordinated their responses within those situations. Outcome indicators record the consequences of those responses, such as progression, disruption, territorial gain, chance creation or ball recovery. These levels should not be conflated: a favourable outcome may result from an opponent's error, whereas a functionally coordinated response may not produce immediate success.

Interpretation should also account for exposure and context. An intended behaviour cannot reasonably be expected when the relevant opportunity rarely occurs, and its appearance in a single sequence provides weak evidence of development. Monitoring should therefore examine the frequency, coordination and adaptability of behavioural tendencies across repeated task exposures, changing opposition responses and progressively more representative conditions. When feasible, observations from training should be compared with corresponding situations in competition.

Complementary evidence may strengthen this evaluation. Systematic observation and video analysis can document tactical opportunities and collective coordination; positional or event data may quantify spatial, temporal and interactional tendencies; and brief player or coach reflections may clarify how relevant information and task intentions were perceived. The choice of evidence should remain proportional to the question being examined and should not imply that every application of the MTTP requires advanced technology.

Monitoring becomes functionally useful when observations are connected to explicit decisions. If the intended tactical problem rarely becomes available, task constraints should be reconsidered. If opportunities occur but coordination remains consistently inappropriate, the coach should examine player readiness, task difficulty and pedagogical intervention. If the intended behaviour appears only under simplified conditions, representativeness should be progressively increased. If it remains stable and adaptable across varied practice and competition contexts, the priority may be progressed, integrated with another problem or temporarily reduced in emphasis. Recurring evidence that the selected priority does not address the underlying performance problem may require reconsideration of the corresponding game-model principle.

Recursive recalibration should therefore operate at different levels and timescales. Immediate evidence may justify modifying a rule, space or numerical relation within the activity; patterns observed across sessions may lead to the continuation or reformulation of a training priority; and evidence accumulated across training and competition may contribute to longer-term refinement of the game model. Monitoring does not close the translation process by confirming whether coaching intentions were reproduced. It reopens that process by testing the adequacy of the decisions through which those intentions were translated into practice.

Operationalising the Model–Task Alignment Matrix

The Model–Task Alignment Matrix evaluates training activities according to two complementary but analytically distinct dimensions: alignment with the selected game-model principle and representativeness of the relevant competitive demands. Alignment concerns whether the task creates meaningful opportunities to engage with the tactical problem that the coach intends to develop. Representativeness concerns whether the activity preserves the information, interactions and perception–action relationships required to regulate behaviour in the corresponding competitive situation.

Neither dimension should be inferred from task format alone. Player numbers, pitch dimensions, rules and spatial configurations describe how an activity is organised, but do not establish its functional value. A task is aligned only when its constraints repeatedly make the selected tactical problem available and enable the relevant behaviours to be observed. It is representative only when players perceive and act upon information functionally related to that which regulates performance in competition.

Table 4 presents a preliminary set of criteria for examining both dimensions. The criteria are intended to support systematic reflection and transparent decision-making rather than to constitute a validated measurement instrument. Each criterion may be rated on a three-point ordinal scale: 0 = absent, contradicted or functionally irrelevant; 1 = partially or inconsistently present; and 2 = clearly and consistently present. Ratings should be supported by task-design information and observation of the activity rather than by the coach's intention alone.

Table 4. Preliminary criteria for assessing model–task alignment and training representativeness.

Dimension	Criterion	Operational question
Model–task alignment	Explicit derivation	Is the task explicitly derived from a defined training priority and corresponding game-model principle?
Model–task alignment	Tactical-problem availability	Does the activity repeatedly create functional opportunities for players to encounter the intended tactical problem?
Model–task alignment	Constraint–priority coherence	Do the manipulated constraints privilege the relevant interactions without distorting the intended tactical function?
Model–task alignment	Behavioural opportunity	Are players able to perceive, select and perform behaviours functionally consistent with the targeted principle?
Model–task alignment	Observability	Can the relevant behaviours and their coordination be evaluated relative to the opportunities created by the task?
Representativeness	Performer–environment coupling	Does performance depend on active interaction with relevant teammates, opponents, the ball and space?
Representativeness	Informational fidelity	Are the principal informational variables that regulate the corresponding competitive behaviour available?
Representativeness	Perception–action coupling	Are players required to perceive, decide and act within the same unfolding sequence rather than perform these processes separately?
Representativeness	Spatiotemporal and consequential fidelity	Does the task preserve functionally relevant spatial, temporal, pressure and action–outcome relationships?
Representativeness	Functional variability	Does the activity include sufficient variation for players to adapt their responses to changing but relevant performance conditions?

Note. The criteria constitute a preliminary heuristic framework and have not been empirically validated. Ratings should be interpreted as ordinal criterion profiles rather than as interval measurements. Model–task alignment must be assessed relative to a previously specified game-model principle and training priority; representativeness must be assessed relative to the competitive situation for which the activity is intended to prepare players.

Assessment should begin before the activity is implemented. The coach should specify the game-model principle, the training priority, the tactical problem to be made available and the corresponding competitive situation. The information that regulates successful performance in that situation should also be identified. Without these prior references, both alignment and representativeness risk being judged retrospectively according to whether the activity appeared successful.

The task should then be observed across a sufficient number of sequences to determine what opportunities it actually generates. A well-intended design may produce few occurrences of the targeted problem, while an apparently simple activity may preserve its essential informational relationships. Whenever possible, ratings

should combine the contextual knowledge of the coach with systematic observation, video review or assessment by a second informed observer. Disagreement should lead to examination of the evidence supporting each rating rather than automatic averaging of subjective scores.

The five ratings within each dimension form an ordinal criterion profile. For preliminary heuristic use, they may also be summed to produce a total ranging from 0 to 10, but this total should not be treated as an interval score or a validated measurement scale. Scores from 0 to 4 indicate predominantly low fulfilment of the dimension, whereas scores from 6 to 10 indicate predominantly high fulfilment. A score of 5 represents a boundary or indeterminate profile and should not be assigned automatically to either category. In all cases, quadrant positioning should be supported by examination of the individual criteria and the contextual evidence on which the ratings are based. These provisional decision rules are intended to improve transparency and require empirical validation.

Importantly, the total score should not replace examination of the criterion profile. Two tasks may obtain the same total through different combinations of strengths and weaknesses. In representativeness, for example, active opposition cannot necessarily compensate for the absence of information that specifies the targeted decision. Similarly, frequent occurrence of a tactical problem does not ensure alignment if the task constraints systematically encourage solutions that conflict with the intended game-model principle.

The resulting profiles allow activities to be positioned within the four quadrants represented in Figure 2. These quadrants should not be interpreted as fixed categories of exercise quality. They describe the relationship between a task and a specified purpose at a particular moment. The same activity may occupy a different position when applied to another training priority, age group, expertise level or stage of learning.

Quadrant I: high alignment and high representativeness
Tasks in this quadrant create repeated opportunities to engage with the intended tactical problem while preserving the principal information–action relationships of competition. They are particularly valuable when the objective is to consolidate, adapt or examine transfer of a game-model principle under functionally realistic conditions. Their classification as high in both dimensions does not guarantee learning, and does it make them universally preferable. Excessive complexity may still exceed players ' current capabilities or reduce the frequency with which the targeted problem occurs.

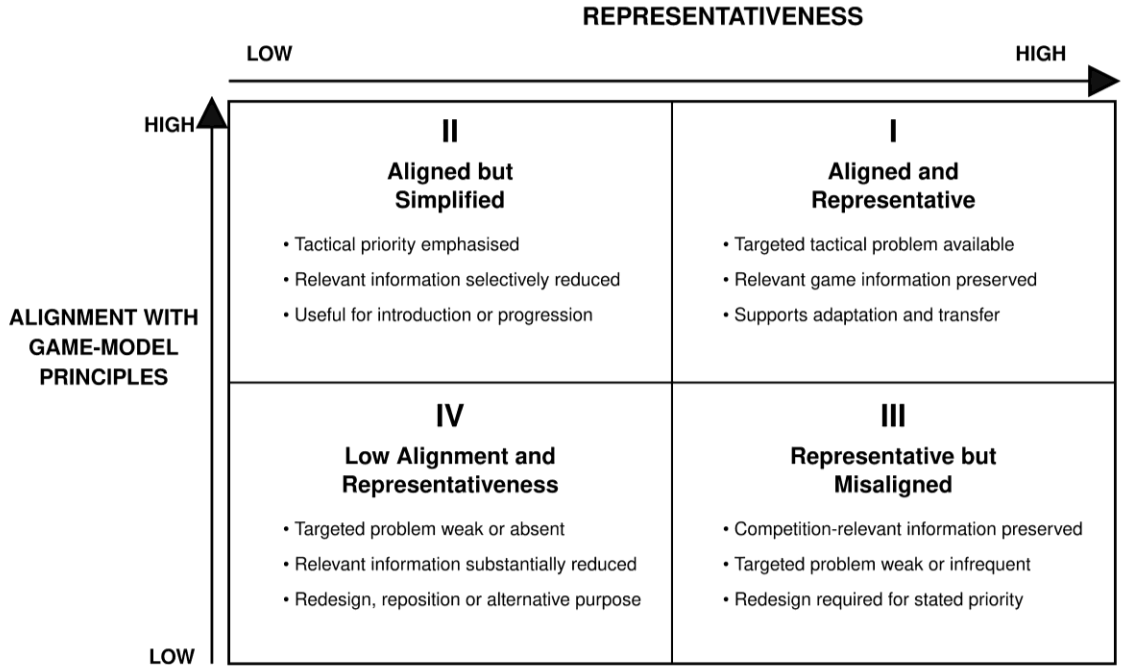
Quadrant II: high alignment and low representativeness
These activities emphasise the intended tactical problem under selectively simplified conditions. They may be useful when introducing a principle, increasing the frequency of a particular interaction or temporarily reducing complexity. Their developmental value depends on whether simplification preserves the functional core of the problem and whether subsequent practice progressively restores relevant information and variability. Remaining indefinitely in this quadrant may limit transfer.

Quadrant III: low alignment and high representativeness
These activities preserve many characteristics of competitive play but provide limited or inconsistent opportunities to develop the selected game-model principle. They may remain useful for general adaptation, assessment, physical conditioning or other explicitly stated purposes. However, when presented as a task for developing a specific tactical priority, they risk creating methodological incoherence. The appropriate response is not necessarily to reduce representativeness, but to reconsider the task constraints or redefine the intended priority.

Quadrant IV: low alignment and low representativeness
Tasks in this quadrant neither make the selected tactical problem meaningfully available nor preserve the principal information–action relationships of competition. Their contribution to the stated tactical priority is therefore limited and the activity should normally be redesigned, repositioned within the session or justified by an objective outside the MTTP, such as rehabilitation or isolated familiarisation. Classification in this quadrant does not imply that the exercise has no possible value; it indicates that its value is poorly supported relative to the specified game-model principle.

When the two dimensions conflict, the appropriate decision depends on the purpose and timing of practice. Alignment may be prioritised temporarily when players require a simplified introduction to a tactical problem, whereas representativeness should progressively increase when adaptation and transfer become central objectives. Conversely, a highly representative activity should not be retained solely because it resembles competition if it repeatedly fails to generate the problem selected for development. The matrix therefore supports progression and task redesign rather than prescribing a single optimal quadrant for every stage of learning.

Figure 2 summarises the interaction between model–task alignment and representativeness. Its principal function is diagnostic: it helps coaches identify why an activity may or may not serve a specified tactical purpose and what form of adjustment may be required.



Note. Alignment refers to coherence with the selected game-model principle; representativeness refers to the preservation of competition-relevant information and perception–action relationships. Quadrant positions are heuristic and context dependent.

Figure 2. Model–Task Alignment Matrix.

Used in this way, the matrix does not prescribe particular training methods or reduce task quality to a numerical score. It provides a structured basis for examining whether task design, experienced information and the selected tactical purpose remain functionally connected. Repeated assessment may also reveal how activities should be simplified, progressed or recalibrated as players and performance demands evolve.

FUTURE RESEARCH DIRECTIONS

Testable propositions derived from the MTTP

The scientific value of the MTTP depends on whether its proposed relationships can be operationalised, examined and revised through empirical evidence. The framework should therefore generate propositions that extend beyond descriptive classification and specify expected relationships among model–task alignment, training representativeness, pedagogical intervention, behavioural emergence and transfer to competition.

At this stage, these relationships are formulated as directional propositions rather than confirmed hypotheses. Their empirical examination depends on the prior validation of the constructs and preliminary assessment criteria introduced in Table 4. The propositions are not intended to exhaust all possible applications of the MTTP; they identify the relationships most central to determining whether the framework possesses explanatory and practical value.

Table 5. Testable propositions derived from the Model-to-Task Translation Process.

Proposition	Predicted relationship	Illustrative operationalisation	Appropriate research design
P1. Alignment–behaviour proposition	Greater model–task alignment will be associated with more frequent and coordinated expression of the targeted tactical behaviours during training.	Alignment profile; number of functional opportunities; proportion of opportunities producing the targeted individual and collective responses; coordination quality.	Repeated-measures observational studies comparing tasks designed to differ in alignment.
P2. Representativeness–transfer proposition	Representativeness will moderate the relationship between model–task alignment and transfer: the association between alignment and expression of targeted behaviours in competition will be stronger when practice preserves relevant information–action relationships.	Alignment and representativeness profiles; behavioural correspondence between training and competition; stability and adaptability across opponents.	Longitudinal designs linking training-task exposure with subsequent competitive behaviour; multilevel moderation models.
P3. Progression proposition	Progression from highly aligned but simplified practice towards highly aligned and representative practice will produce stronger transfer than prolonged exposure to simplified conditions alone.	Planned movement from Quadrant II towards Quadrant I; behavioural performance during simplified practice, representative practice and competition.	Controlled interventions comparing progressive and non-progressive task sequences.
P4. Cumulative coherence proposition	More consistent model–task alignment across successive sessions will be associated with greater stability and adaptability of targeted collective behaviours than isolated exposure to highly aligned tasks.	Session-level alignment profiles; cumulative exposure; longitudinal change in tactical coordination, variability and opponent-specific adaptation.	Prospective longitudinal studies using session-level observations nested within players and teams.
P5. Pedagogical congruence proposition	Pedagogical interventions that direct attention towards information relevant to the training priority, without prescribing invariant solutions, will strengthen the relationship between task design and adaptive behavioural emergence.	Congruence between intervention content and training priority; timing and frequency of feedback or questioning; functional variability and behavioural coordination.	Comparative interventions, systematic observation of coaching behaviour and mixed-method studies.

P6. Recursive recalibration proposition	Systematic use of behavioural evidence to recalibrate training priorities and task constraints will improve subsequent model–task coherence more than planning that does not incorporate structured feedback.	Documentation of observation-informed task adjustments; changes in alignment profiles; subsequent availability and expression of targeted behaviours.	Longitudinal case studies, interrupted time-series designs or team-level comparative interventions.

Note. The propositions express theoretically expected relationships rather than established causal effects. MTTP = Model-to-Task Translation Process.

The propositions operate at different levels of analysis and should not be interpreted solely through task outcomes. For P1, alignment must be evaluated in relation to the opportunities generated: the absence of a targeted response is informative only when the relevant tactical problem was available, while an apparently successful action provides weak evidence when it results from an atypical event or an opponent's unforced error.

P2 and P3 distinguish the expression of behaviour during practice from transfer beyond it. Alignment may increase engagement with the selected tactical problem, but transfer is expected to depend on whether practice preserves the information–action relationships that regulate performance in competition. P4 extends this reasoning from the individual task to cumulative exposure, proposing that coherence across successive sessions matters more than isolated use of a highly aligned activity.

P5 and P6 address the regulation of the translation process. Pedagogical intervention may strengthen task functionality when it directs attention towards relevant information without prescribing invariant solutions. Systematic monitoring may, in turn, improve subsequent decisions by revealing whether priorities, constraints and task progressions require adjustment. Together, the six propositions establish an empirical programme spanning task sequences, training sessions, intervention periods and competitive seasons. Evidence should be used not only to examine the predicted relationships but also to refine the constructs and boundary conditions of the MTTP.

Measuring model–task alignment

The empirical examination of Propositions 1, 3, 4 and 6 requires valid and reliable methods for assessing model–task alignment. The preliminary criteria proposed in Table 4 translate the construct into observable questions, but they should not yet be interpreted as a psychometrically established measurement instrument.

Research must determine whether these criteria adequately represent the construct, can be applied consistently across observers and coaching contexts, and meaningfully discriminate between tasks with different relationships to the intended game model.

Addressing this gap requires moving beyond descriptive features such as pitch dimensions, player numbers or exercise format. Instead, research should examine whether practice tasks consistently expose players to the tactical problems, informational demands and decision-making opportunities associated with the principles they are intended to develop. Alignment should therefore be evaluated according to function rather than appearance.

One promising direction is the development of observational instruments capable of linking game-model principles, task characteristics and performance outcomes. For example, a practice designed to develop coordinated high pressing could be assessed according to the frequency and quality of pressing triggers,

collective synchronisation, defensive cover and ball recovery opportunities it generates. Similarly, tasks targeting positional play could be examined through indicators related to spatial occupation, support structures, ball circulation and the creation or exploitation of numerical superiority.

Future research may also benefit from combining systematic observation with expert judgement. Coaches possess detailed contextual knowledge of their intended playing model, but this expertise must be translated into explicit and reliable evaluation criteria if alignment is to be examined rigorously. Integrating coach interviews, expert panels, video analysis and performance indicators could therefore provide a more comprehensive approach while preserving the contextual nature of coaching practice. Validation should proceed in stages. Content validity may initially be examined through expert consultation and structured consensus procedures. Interobserver reliability should then be tested using standardised video samples and independently applied rating criteria. Construct validity may be explored by comparing tasks intentionally designed to differ in alignment, while predictive and ecological validity require examining whether higher alignment is associated with more frequent, coordinated or adaptable expression of the targeted behaviours during subsequent training and competition.

Another important question concerns the degree of alignment. Rather than treating alignment as a simple yes-or-no condition, future studies should examine it as a continuum. Practice tasks are likely to differ in the extent to which they reinforce particular playing principles, and these differences may have important consequences for learning, transfer and long-term player development.

Validating model–task alignment would provide a direct test of the MTTP's central translational claim. Reliable assessment should determine not only whether tasks differ in alignment, but whether those differences are associated with the availability, coordination and subsequent expression of the targeted tactical behaviours.

Assessing training representativeness

The empirical examination of Propositions 2 and 3 requires valid and context-sensitive methods for assessing training representativeness. Table 4 proposes preliminary criteria concerning performer–environment coupling, informational fidelity, perception–action coupling, spatiotemporal and consequential fidelity, and functional variability. These criteria provide a starting point for systematic analysis, but their relevance, reliability and sensitivity across football contexts and developmental levels remain to be established.

Although Representative Learning Design has become a central concept in skill acquisition and coaching, there is still limited agreement on how representativeness should be defined, measured and evaluated in applied football settings. Consequently, coaches often rely on subjective judgement when determining whether practice adequately reflects the informational and tactical demands of competition.

From an ecological perspective, representativeness refers to the extent to which practice preserves the informational variables that regulate action during competition (Pinder et al., 2011; Chow et al., 2016; Woods et al., 2020). Effective practice should therefore provide opportunities for players to perceive, decide and act in response to information that closely resembles that encountered in match play. Preserving these informational relationships is considered essential for developing perception–action couplings that transfer successfully beyond the training context.

Despite broad acceptance of this principle, assessing representativeness remains challenging. Activities may appear highly game-like while failing to preserve the informational features that drive decision-making.

Conversely, practice tasks that differ substantially from competition in their outward appearance may still retain the critical tactical and perceptual demands required for effective learning. Representativeness should therefore be evaluated according to informational fidelity rather than visual similarity.

Future research should focus on identifying practical indicators capable of operationalising representativeness in football. Variables such as interpersonal interactions, spatial-temporal relationships, perceptual demands, decision-making opportunities and tactical problem structures provide promising starting points. Comparing these characteristics across training and competition could establish more objective criteria for evaluating the extent to which practice reflects the informational realities of the game.

Another promising direction is the examination of representativeness across different stages of player development. Younger or less experienced players may benefit from practice that selectively simplifies informational demands without compromising their functional relevance, whereas advanced performers may require increasingly representative conditions to maximise transfer to competition. Investigating how representativeness should evolve across developmental stages could provide valuable guidance for age-specific and expertise-specific practice design.

Research should ultimately determine which informational relationships must be preserved, which may be temporarily simplified and how these requirements vary with expertise and developmental stage. Such evidence is necessary to distinguish functional simplification from task designs that remove the information required for transfer.

Tracking behavioural emergence over time

A third priority for future research is the longitudinal investigation of behaviour emergence. Although this concept is central to contemporary perspectives on learning and performance, relatively little research has examined how coordinated team play develops over extended periods of football training. Most existing studies focus on short-term interventions, isolated practice tasks or single matches, providing only limited insight into how behaviours functionally related to playing principles become progressively more frequent, coordinated and adaptable within team performance.

This research direction is particularly relevant to Propositions 2 and 4. Testing transfer and cumulative coherence requires repeated observation of both training exposure and competitive behaviour, while accounting for changes in opponents, player availability, task design and competitive context.

Longitudinal research could provide valuable insight into how players progressively attune to the informational variables that regulate performance. Such studies may examine the evolution of tactical awareness, coordination, decision-making and collective adaptation as teams gain sustained exposure to coherent practice. This perspective would advance understanding of learning as a gradual developmental process rather than a sequence of isolated acquisitions.

Future work should also examine the temporal dynamics of development. Different playing principles are unlikely to evolve at the same rate. Some aspects of collective play may stabilise relatively quickly, whereas others may require prolonged exposure before becoming consistently expressed. Identifying these developmental trajectories would improve understanding of the relationship between practice design, learning and performance.

Another important question concerns the stability of emerging performance patterns. Football is characterised by continual adaptation to changing opponents and competitive contexts, making variability an inherent feature of performance. Longitudinal studies could help distinguish adaptive flexibility from inconsistency arising from insufficient development, providing coaches with more meaningful criteria for interpreting change over time.

Training history also deserves greater attention. Players do not enter practice as blank slates but bring experiences accumulated across previous teams, coaches and developmental environments. Examining how these experiences influence responsiveness to different training processes may improve understanding of why teams and individuals evolve differently despite being exposed to similar practice conditions.

Methodologically, this area would benefit from integrating quantitative and qualitative approaches. Positional data, social network analysis, tactical performance indicators and systematic observation can document changes in collective functioning, while interviews, reflective methods and video-based discussions may reveal how players interpret tactical problems and construct shared understanding. Combining these approaches would provide a richer account of long-term development than either could achieve independently.

Longitudinal evidence is required to test whether cumulative coherence is associated with greater stability and adaptability of targeted collective behaviours. Such designs should also clarify the timescales over which different tactical tendencies develop and distinguish functional variability from inconsistency arising from insufficient exposure or poorly aligned practice.

Investigating game-model development

A fourth priority for future research is the longitudinal investigation of game model development. Although game models are commonly described as relatively stable references for organising team play, coaching practice suggests that they evolve continuously in response to experience, player development and changing competitive demands. They should therefore be understood not as fixed structures but as dynamic systems that are progressively refined over time.

Despite their central importance in football coaching, relatively little research has examined how game models are constructed, adapted and transformed across extended periods of practice and competition. Most existing studies provide cross-sectional descriptions of tactical characteristics, offering limited insight into the developmental processes through which playing principles are established, adjusted and consolidated. Consequently, our understanding of how coaches shape and refine their game models throughout their professional careers remains incomplete.

Longitudinal research could help clarify the mechanisms that drive this evolution. Studies may investigate how playing principles change in response to player profiles, competitive experiences, injuries, tactical innovations or shifts in coaching philosophy. Such work would contribute to a more realistic understanding of coaching as an adaptive process rather than the implementation of a predetermined tactical blueprint.

Particular attention should be given to the balance between continuity and change. Successful teams often preserve a recognisable playing identity while adapting to new challenges and competitive contexts. Future research could therefore examine how coaches maintain core principles while modifying specific aspects of the game model in response to evolving circumstances. Understanding this balance would address one of the most persistent questions in football coaching: how to remain consistent without becoming inflexible.

Proposition 6 concerns the reciprocal relationship between observed performance and game-model development. The MTTP proposes that evidence from training and competition informs subsequent priorities, task constraints and over longer periods, the refinement of the game model itself. Longitudinal studies could examine how recurring tactical tendencies lead to changes in planning and whether those adjustments subsequently alter practice and competitive performance.

Research should also examine how model development differs across coaching contexts. Professional teams, youth academies and long-term development programmes operate under different constraints, objectives and timescales, all of which are likely to influence the pace and nature of tactical evolution. Comparative studies across these settings could provide valuable insight into how contextual factors shape the development of a team's playing identity.

Methodologically, this field would benefit from combining tactical analysis with coach-centred inquiry. Match and training data can document changes in team organisation over time, while interviews, planning documents and observational studies can reveal the reasoning that underpins those changes. Integrating these sources would enable researchers to examine both the evolution of team play and the decision-making processes that drive it.

CONCLUSION

This paper addressed the insufficiently articulated relationship between coaching intentions, game-model principles and everyday training design by proposing the MTTP as an integrative conceptual and decision-guiding framework. The MTTP is not an empirically validated training method or a prescriptive sequence of exercises. Its originality lies in specifying the differentiated functions and relationships through which strategic intentions may inform training priorities, task constraints, learning environments and observable team behaviour.

The framework offers three principal conceptual contributions. First, it establishes a vertically coherent pathway through which coaching decisions can be traced from strategic intention to task design and behavioural evaluation. Second, it distinguishes model–task alignment from training representativeness: the former concerns whether practice makes a selected tactical problem available, whereas the latter concerns whether players engage with that problem through competition-relevant information and perception–action relationships. Third, it conceptualises translation as recursive, because evidence from training and competition may lead to the recalibration of priorities, tasks and the game model itself.

These contributions depend on conditional functional integration rather than epistemological equivalence among Tactical Periodization, Ecological Dynamics, the Constraints-Led Approach, Nonlinear Pedagogy and Coaching Pedagogy. Within the MTTP, the game model provides functional direction without prescribing invariant actions; constraints shape opportunities without determining solutions; and pedagogical intervention may guide attention without replacing players ' perception and decision-making. The game model therefore operates as a dynamic reference that channels adaptation while remaining responsive to players, opponents and context.

For practitioners, the MTTP provides a rationale for moving from exercise selection towards the explicit justification of task purpose, design and evaluation. The applied case and Model–Task Alignment Matrix illustrate how coaches may examine whether a tactical problem is available, whether relevant information is preserved and whether observed responses warrant task progression or redesign. These tools are

preliminary and should support contextual judgement rather than prescribe a universally optimal form of practice.

For research, the six directional propositions specify expected relationships concerning alignment, representativeness, task progression, cumulative coherence, pedagogical congruence and recursive recalibration. Their examination requires validation of the proposed constructs and assessment criteria through observational, longitudinal, intervention-based and mixed-method designs. Evidence may support, qualify or reject these relationships and should be used to refine the framework's assumptions and boundary conditions.

The MTTP thus provides a conceptually explicit and empirically examinable account of how an intended way of playing may acquire practical expression through training. Its contribution will ultimately depend on whether it improves the precision with which researchers and practitioners design, observe and evaluate the translation between game model and training task.

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

AI USE DISCLOSURE

In accordance with current publishing ethics and transparency recommendations, artificial intelligence (AI) tools were used solely to assist with translation and language editing, with the aim of improving clarity and readability. No AI tools were used in the generation of scientific content, including the study design, data collection, analysis, interpretation of results, or the formulation of conclusions. The authors retain full responsibility for the content of the manuscript and confirm its originality, integrity, and accuracy.

REFERENCES

Araújo, D., Davids, K., & Hristovski, R. (2006). The ecological dynamics of decision making in sport. *Psychology of Sport and Exercise,* 7(6), 653-676. https://doi.org/10.1016/j.psychsport.2006.07.002

Castelo, J. (1994). *Futebol: Modelo técnico-táctico do jogo: Identificação e caracterização das grandes tendências evolutivas das equipas de rendimento superior*. Faculdade de Motricidade Humana.

Castelo, J. (2009). *Futebol: Organização dinâmica do jogo* (3rd ed.). Faculdade de Motricidade Humana.

Chow, J. Y., Davids, K., Button, C., Shuttleworth, R., Renshaw, I., & Araújo, D. (2007). The role of nonlinear pedagogy in physical education. *Review of Educational Research,* 77(3), 251-278. https://doi.org/10.3102/003465430305615

Chow, J. Y., Davids, K., Button, C., & Renshaw, I. (2016). *Nonlinear pedagogy in skill acquisition: An introduction*. Routledge. https://doi.org/10.4324/9781315813042

Chow, J. Y., Davids, K., Button, C., & Renshaw, I. (2022). *Nonlinear pedagogy in skill acquisition: An introduction (2nd ed.)*. Routledge. https://doi.org/10.4324/9781003247456

Cushion, C. J., Armour, K. M., & Jones, R. L. (2003). Coach education and continuing professional development: Experience and learning to coach. *Quest, 55*(3), 215-230. https://doi.org/10.1080/00336297.2003.10491800

Davids, K., Araújo, D., Vilar, L., Renshaw, I., & Pinder, R. A. (2013). An ecological dynamics approach to skill acquisition: Implications for development of talent in sport. *Talent Development & Excellence, 5*(1), 21-34.

Davids, K., Button, C., & Bennett, S. (2008). *Dynamics of skill acquisition: A constraints-led approach*. Human Kinetics.

Duarte, R., Araújo, D., Correia, V., & Davids, K. (2012). Sports teams as superorganisms: Implications of sociobiological models of behaviour for research and practice in team sports performance analysis. *Sports Medicine, 42*(8), 633-642. https://doi.org/10.2165/11632450-000000000-00000

Garganta, J. (1997). *Modelação táctica do jogo de futebol: Estudo da organização da fase ofensiva em equipas de alto rendimento* [Doctoral dissertation, Universidade do Porto].

Garganta, J. (2009). Trends of tactical performance analysis in team sports: Bridging the gap between research, training and competition. *Revista Portuguesa de Ciências do Desporto, 9*(1), 81-89. https://doi.org/10.5628/rpcd.09.01.81

Gibson, J. J. (1979). *The ecological approach to visual perception*. Houghton Mifflin.

Jones, R. L. (Ed.). (2006). *The sports coach as educator: Re-conceptualising sports coaching*. Routledge. https://doi.org/10.4324/9780203020074

Lyle, J., & Cushion, C. (2017). *Sport coaching concepts: A framework for coaching practice (2nd ed.)*. Routledge. https://doi.org/10.4324/9780203126424

Nelson, L. J., Cushion, C. J., & Potrac, P. (2006). Formal, nonformal and informal coach learning: A holistic conceptualisation. *International Journal of Sports Science & Coaching, 1*(3), 247-259. https://doi.org/10.1260/174795406778604627

Newell, K. M. (1986). Constraints on the development of coordination. In M. G. Wade & H. T. A. Whiting (Eds.), *Motor development in children: Aspects of coordination and control* (pp. 341-360). Martinus Nijhoff. https://doi.org/10.1007/978-94-009-4460-2_19

O'Donoghue, P. (2021). *An introduction to performance analysis of sport (3rd ed.)*. Routledge.

Oliveira, B., Amieiro, N., Resende, N., & Barreto, R. (2006). *Mourinho: Porquê tantas vitórias?* Gradiva.

Pinder, R. A., Davids, K., Renshaw, I., & Araújo, D. (2011). Representative learning design and functionality of research and practice in sport. *Journal of Sport and Exercise Psychology, 33*(1), 146-155. https://doi.org/10.1123/jsep.33.1.146

Plakias, S. (2023). An integrative review of the game model in soccer: Definition, misconceptions, and practical significance. *Trends in Sport Sciences, 30*(2), 85-92.

Rein, R., & Memmert, D. (2016). Big data and tactical analysis in elite soccer: Future challenges and opportunities for sports science. *SpringerPlus, 5*, Article 1410. https://doi.org/10.1186/s40064-016-3108-2

Renshaw, I., Davids, K., Newcombe, D., & Roberts, W. (2019). *The constraints-led approach: Principles for sports coaching and practice design*. Routledge. https://doi.org/10.4324/9781315102351

Sarmento, H., Anguera, M. T., Pereira, A., & Araújo, D. (2018). Talent identification and development in male football: A systematic review. *Sports Medicine, 48*(4), 907-931. https://doi.org/10.1007/s40279-017-0851-7

Seifert, L., Araújo, D., Komar, J., & Davids, K. (2017). Understanding constraints on sport performance from the complexity sciences paradigm: An ecological dynamics framework. *Human Movement Science, 56*, 178-180. https://doi.org/10.1016/j.humov.2017.05.001

Silva, P., Garganta, J., Araújo, D., Davids, K., & Aguiar, P. (2013). Shared knowledge or shared affordances? Insights from an ecological dynamics approach to team coordination in sports. *Sports Medicine, 43*(9), 765-772. https://doi.org/10.1007/s40279-013-0070-9

Tamarit, X. (2013). *Periodización táctica: Vivenciar el juego para condicionar el juego*. MC Sports.

Travassos, B., Araújo, D., Duarte, R., & McGarry, T. (2012). Spatiotemporal coordination behaviours in futsal (indoor football) are guided by informational game constraints. *Human Movement Science, 31*(4), 932-945. https://doi.org/10.1016/j.humov.2011.10.004

Woods, C. T., Rudd, J., Robertson, S., & Davids, K. (2020). Wayfinding: How ecological perspectives of navigating dynamic environments can enrich our understanding of the learner and the learning process in sport. *Sports Medicine - Open, 6*, Article 51. https://doi.org/10.1186/s40798-020-00280-9