

# DESIGNING FOR LEARNING" LESSONS SPORTS COACHES CAN DRAW FROM VIDEO GAME DESIGN PRINCIPLES

RAMESH P<sup>1\*</sup>, MARIAAPPAN S<sup>2</sup>, SATHEESH KUMAR T<sup>3</sup>, ATHISAYARAJ S<sup>4</sup>, PRABHAKARI U<sup>5</sup>

\*<sup>1</sup>DEPARTMENT OF PHYSICAL EDUCATION, HEALTH EDUCATION AND SPORTS. ST. JOSEPH'S COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI, TAMILNADU, INDIA,

<sup>2</sup>DIRECTOR OF PHYSICAL EDUCATION SRI K.G.S ARTS COLLEGE, SRIVAIKUNTAM, THOOTHUKUDI, TAMIL NADU, INDIA,

<sup>3</sup>ASSISTANT DIRECTOR (PHYSICAL EDUCATION), DR.B. R. AMBEDKAR INSTITUTION OF TECHNOLOGY, PORT BLAIR, ANDAMAN AND NICOBAR ISLANDS(UT),

<sup>4</sup>DEPARMENT OF PHYSICAL EDUCATION, ST. XAVIER'S COLLEGE (AUTONOMOUS), PALAYAMKODAI, TIRUNELVELI TAMILNADU, INDIA, <sup>5</sup>DIRECTOR OF PHYSICAL EDUCATION, K. RAMAKRISHNAN COLLEGE OF ENGINEERING (AUTONOMOUS), SAMAYAPURAM, TIRUCHIRAPPALLI, TAMILNADU, INDIA

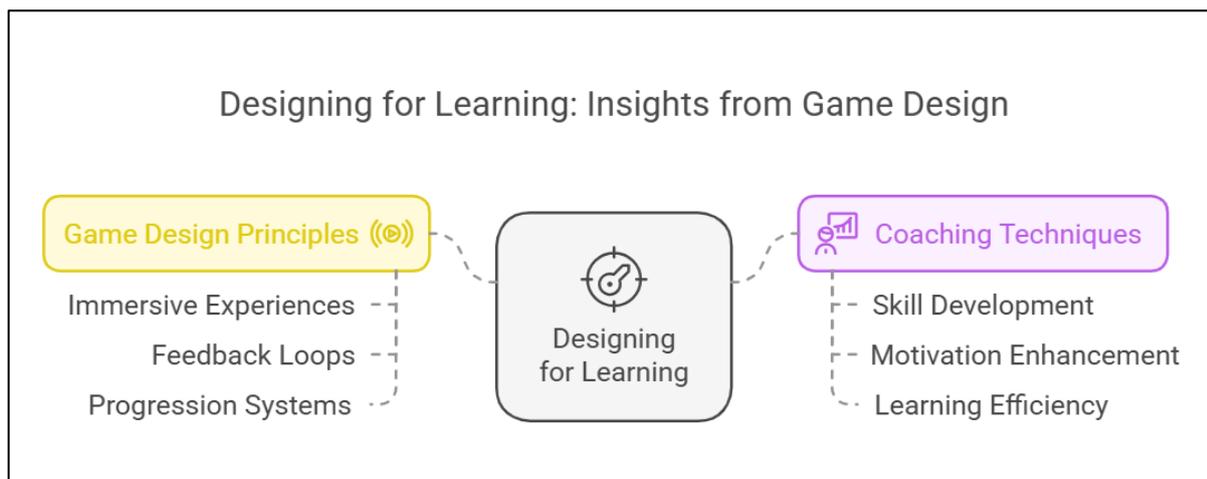
## Abstract

The sports science literature has witnessed numerous calls for promoting interdisciplinarity to advanced solutions to some of the most pressing challenges facing the sports industry. Creating practice settings that foster learning is a significant challenge, especially considering modern views on skill development. Coaches should re-evaluate their role and become more involved in designing training activities that foster communication between athletes and their surroundings. Through exploration, performers develop their skills by deepening their understanding of their performance environment as they overcome obstacles created by shifting and interconnected constraints. This study demonstrates an interdisciplinary method for examining the field of learning through sports by applying established concepts from video game development. A total of 08 key principles associated with effective video game design are outlined, accompanied by real-world examples from various sports. The main aim of this paper is to provide sports professionals with a detailed summary and hands-on guide to key design principles that can help with the learning process. The concepts discussed here demonstrate the importance of interdisciplinary approaches to sports research and on-the-ground practice.

**Keywords:** Practice, Interdisciplinary, Skill, Training

## INTRODUCTION

In the last 30 years, numerous appeals have been made in the sports literature to advance interdisciplinary approaches to address and overcome several longstanding sports-related challenges. Creating suitable learning environments for performers at various stages of participation is a challenge that numerous individuals and groups can work together effectively. The complexity of sports environments is a major factor in the difficulties encountered in this task. Addressing performance-related issues using a thorough and organized method. Recently, criticism has been directed at the fundamental oversimplification and linear nature of these methods. In response to increasing examination, current views of learning and performance in sports have sought to merge both interdisciplinary and transdisciplinary methods, combining concepts, techniques, and ideas from various fields to overcome traditional limitations and create new avenues. There is an increasing demand for coaches to assume the responsibilities of learning designers, concentrating on the pivotal aspect that interaction between the performer and their environment plays in their design strategy. It is suggested in a rationale for ecological dynamics that learning and practice environments can develop from more artificial rote learning methods into environments rich in information, thereby facilitating exploration, discovery, and adaptability when tackling complex and novel problems. By engaging in the process of exploration, artists gain the opportunity to refine their abilities, incrementally figuring out how to tackle obstacles by monitoring and controlling their thoughts, emotions, and actions to achieve a specific goal. Essentially, the process of acquiring a skill results in a complex and dynamic interaction between individuals and the limitations of their surroundings. This study demonstrates the effectiveness of incorporating sound video game design principles into the sports arena to enhance learning and performance through an ecological dynamics framework. This approach fosters interdisciplinarity by showing how conventional educational techniques from one subject area can be modified to support others, prompting professionals to view themselves from the perspective of a learning designer. sights from game design



Video games are highly engaging, structured, and highly immersive, and they keep players motivated for hours. Sports coaching and training can use game design principles to improve learning, athletic skill acquisition, and athlete participation.

### 1. Clear Goals & Immediate Feedback

In the context of video games and sports, players are aware of their goals and receive immediate feedback on their actions, such as completing a level or overpowering an opponent. In sports, this can be achieved using real-time feedback tools such as wearables, video analysis tools, and AI performance tracking. Additionally, clear short-term goals can be set within training sessions, for example, to "improve your reaction speed by 10%".

### 2. Progression & Leveling Up

In video games and sports, a structured approach is used where players or athletes begin with basic tasks and progress to increasingly complex challenges as they master the fundamentals. This can be achieved through tiered training programs and performance tracking charts that provide visual feedback on skill development.

### 3. Engagement Through Gamification

Video games often feature leaderboards, achievements, and competitive elements to keep players interested. Sports applications can be enhanced by introducing mini-tasks with incentives, such as skill-based ranking systems and milestone badges. This can also involve creating training leaderboards for fitness metrics, reaction times, and tactical execution.

### 4. Adaptive Learning and Decision-Making

Players in both video games and sports encounter dynamic challenges that require them to quickly adjust their strategies. Sports teams can improve decision-making under pressure by implementing small-sided games and scenario-based drills.

### 5. Safe failure and experimentation

In video games, participants can experience failure without facing real-life consequences; thus, they acquire knowledge through trial and error. Similarly, sports training can employ low-stake environments, enabling athletes to test new methods without anxiety of failure. Furthermore, simulated game scenarios can be used to teach athletes how to manage pressure and make swift, decisive actions.

### 6. Immersive Environments and Flow States

Engaging video game elements such as storylines, challenges, and flow states help keep players completely absorbed. Sports training can benefit from adopting similar techniques: use virtual reality simulations, visualization methods, and mental practice. Additionally, create practice sessions designed around flow states, striking a balance between challenge and skill level to maintain athlete engagement.

### 7. Data-Driven Personalization

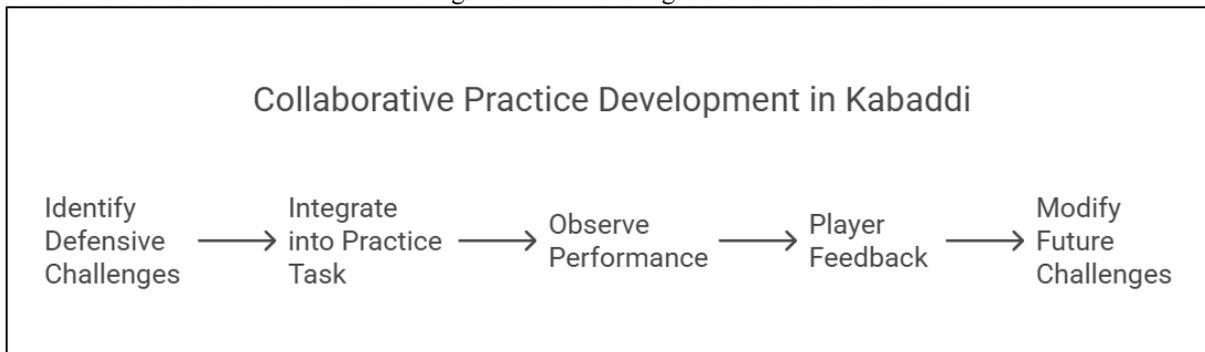
Gaming experiences and player performance are dynamically adjusted by AI-driven data analysis, with difficulty levels and overall gameplay tailored to the individual player's abilities. Sport-specific applications of AI and wearable technology enable athletes to receive customized training regimens based on their unique strengths and weaknesses, as well as detailed performance metrics to refine their skills.

## Empowered Learners

The primary objective of effective learning design is to help students become proficient and intelligent individuals. An intelligent performer functions effectively in a particular environment by adapting and staying engaged and motivated through ecological dynamics, which allows them to learn quickly and rely on perception, cognition, emotions, and actions. Good video game designs, as suggested by Gee, enable players to feel a sense of agency, where their actions and decisions are perceived as their own rather than simply implementing the game's designer's intentions. Individuals can be involved in designing their own learning activities, with an invitation to collaborate on developing environment features that encourage specific behaviours. Engaging individuals in the Organization of their educational exercises. May foster a sense of active participation in which they perceive a shared responsibility for their educational outcomes rather than simply being a passive recipient of ongoing instruction from educators.

## Principals of sports

The head coach of a top-level kabaddi team might Develop a practice drill in conjunction with a point guard to evaluate an offense's strengths. The coach may inquire of the point guard which defensive schemes they find particularly difficult for both themselves and their teammates to implement successfully while preserving the team's fluidity of movement. Following identification of these structures by both the coach and the player, they can collaborate to incorporate them into a practice exercise. The coach would next observe the point guard and their teammates. attempt to overcome the opposing team's defense during the exercise and afterwards ask them to describe the game-like nature and level of difficulty, as well as identify potential modifications. The coach could employ this questioning technique during the performance to prompt players to investigate different areas of the performance environment that were co-designed. Players do not necessarily need to verbalize their responses to in-game questions; instead, they can demonstrate their understanding by searching for, finding, and taking advantage of different opportunities to interact with their surroundings. This knowledge can then be used as a foundation to inform the design of future challenges for the team's offense.

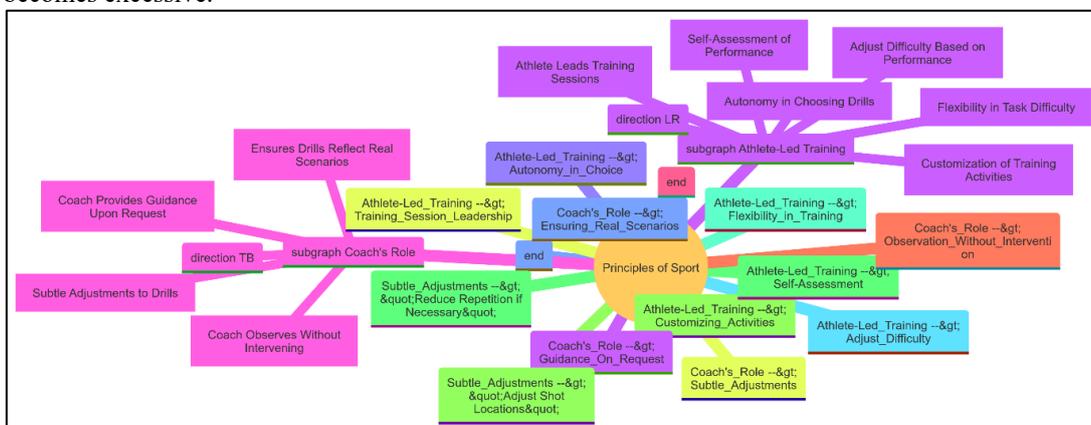


**Principle 2: Customize**

Success as a self-regulated learner is unlikely without individuals being able to decide on the specifics of their own learning environments From a perspective of ecological dynamics, self-regulation encompasses the regulation of perceptions, thoughts, emotions, and behaviors, which are developed through the use of specifically designed practice tasks. Performers could occasionally be encouraged to customise the information presented by the educator to match their own understanding of what they grasp or have difficulty with. To promote the development of active self-regulation, performers could occasionally be motivated to tailor the information provided by the educator to align with their own perceptions of what they comprehend or struggle with based on their own understanding. By adopting this approach, the learner may be motivated to discover novel and creative learning methods that the educator had not previously thought of.

**Principles of sport**

Allowing athletes to lead their own Training sessions can provide the flexibility to develop activities that trainers believe will improve their performance. In these coaching sessions, the coach observes the athlete(s) without interfering and only offers guidance when specifically asked for it. A netball goal shooter can adjust the level of difficulty in practice drills designed to improve their shooting accuracy, choosing either to simplify the task or increase its challenge based on the number of shots they have successfully or failed to make. Coaches should implement subtle modifications to practice tasks, like posing questions to goal shooters about attempting the shot from varied locations on the court, when repetition becomes excessive.

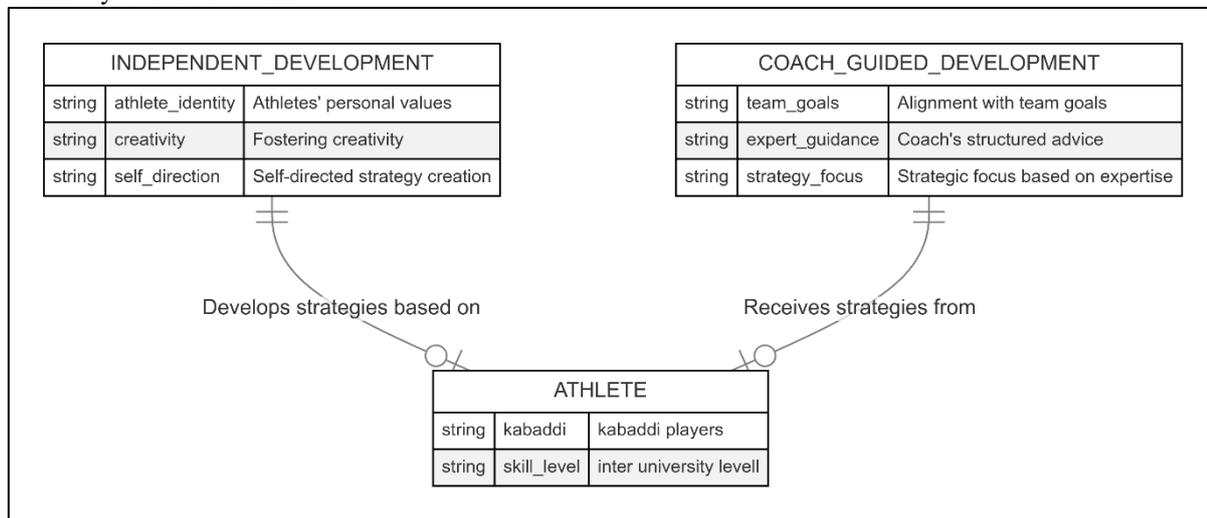


**Identity**

Establishing a sense of identity within and among peers can support individual learning. A learner's identity is likely to focus their engagement on a particular One aspect of their learning environment is dedicated to directing their attention toward its upkeep and maintenance. In line with Ryan and Deci's recommendation, this approach can enable the performer to assume a more substantial role in moulding the learning environment, synchronising their actions and learning with a motivation to realise and maintain their identity.

**Principles of sport**

Athletes can establish their own strategic guidelines by formulating them on their own, separate from a coach, and guided by the core values they deem crucial to preserving the image they wish to uphold. A rugby league team might choose unconventional tactics, which could result in exciting and thrilling gameplay. Encouraging this behaviour would prompt players to review their practice and competition settings for opportunities to replicate such actions on offense, without being restricted to a preconceived method. A young player who sees themselves as a potential future leader may proactively seek out developmental opportunities within the training setting to enhance their leadership skills, which can ultimately benefit the team.



**Control and Dissemination of Information**

From an ecological dynamics perspective, the fundamental relationship between perception and action is characterized by a close interconnection, where individuals are able to continue perceiving and acting simultaneously as they move. From this standpoint, learning is viewed as an inquiry-based process in which individuals continually develop the ability to recognize diverse options for action that evolve as their capacity for action changes. During performance preparation, individuals need to experience various occasions where they can apply and share their knowledge of multiple viewpoints or performance settings. Engaging with their capabilities will likely influence their perceptions. This prompts them to become more attentive to various action possibilities when striving to achieve a particular task objective. To achieve varied performance results, athletes could be encouraged to modify their surroundings or share their skills across different aspects of the learning experience in order to broaden and improve their abilities.

**Principle in Sport**

Encouraging athletes to assume coaching responsibilities is a viable option. The athlete will be responsible for designing a learning activity that outlines its objectives and task requirements, and will also need to make any necessary adjustments to its design in real-time as needed. By doing this, the athlete will gain a deeper understanding of the game from the coach's perspective, taking into account the different aspects of the game and potential next steps that the coach is likely to see from their own vantage point. A coach may be able to also manipulate the roles and positions of team game players to redistribute a player's game knowledge by having defenders play as forwards and vice versa.

**Well-ordered Problems**

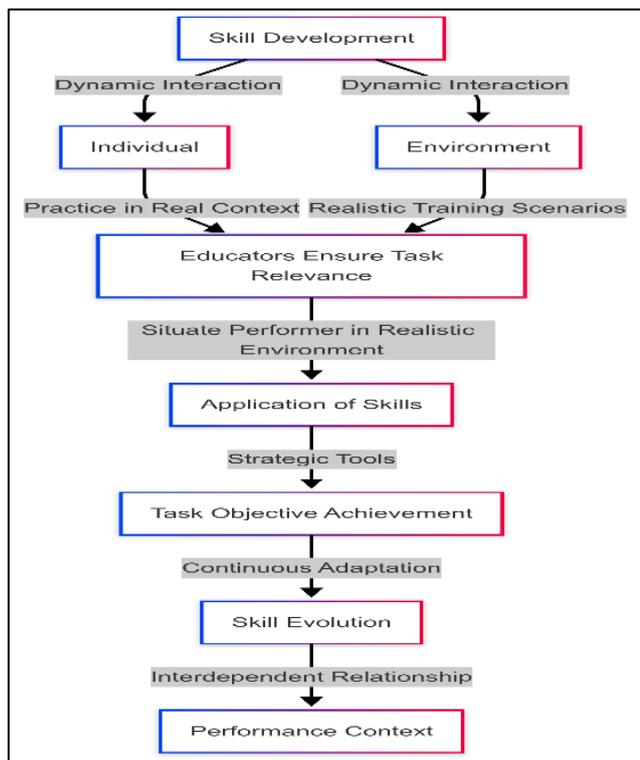
During skill acquisition, from an ecological dynamics perspective, the skills acquired form a dynamic and adaptive connection between the individual performing and their performance setting, as they learn to adapt their movements in response to emerging problems encountered. To effectively engage learners, challenges within learning exercises should be carefully calibrated to match the individual's abilities and action capabilities. If difficulties are excessive, the learner may struggle to resolve the issue or find an unsatisfactory solution, ultimately resulting in Challenging experiences that may restrict potential for future problem-solving abilities.

**Principles of sport**

A crucial element of effective attacking tactics in kabaddi is the capacity to govern the pace, which pertains to responding to situations demanding rapid or sluggish physical activity, contingent upon a range of co-related factors, such as an opponent's defensive strategy and the current phase of the game. A coach can help players identify opportunities by presenting them with well-structured problems during gameplay. A coach could initiate a task by briefing the offense that the defence will be either two players ahead or behind, thereby enabling them to devise tactics and consider the possibilities of rapid or slow movement based on the identified issue. With some level of success achieved in these more manageable problems, the coach can then introduce random variations in defender numbers without notifying the opposing team during the training exercise at that point. For the offense team, playing becomes more difficult and complex, requiring them to adapt to making adjustments to their in-body movement speed during gameplay rather than focusing on pre-game solutions to anticipated issues. This highlights the coach's role as closely resembling that of a designer, where issues are gradually integrated. Without predefined solutions, the practice task encourages players to delve deeper into the performance environment, exploring its dynamic and ephemeral pathways for action.

**Skills as Strategies**

Skills arise as a The outcome of the dynamic interaction between an individual and their surroundings. Educators are required to ensure that the practice task is relevant to the specific environment or context. setting where the skill is intended to be applied, even though extensive practice is necessary to acquire that skill. Practice tasks should be directly incorporated into training, with the performer situated within a realistically simulated environment that prompts them to apply skills as strategic tools to accomplish a specific task objective. This principle recognises the interconnectedness of the performer and their surroundings, pointing out that what is being progressively developed is not a standalone action plan but rather a dynamic and evolving bond within a particular performance setting.

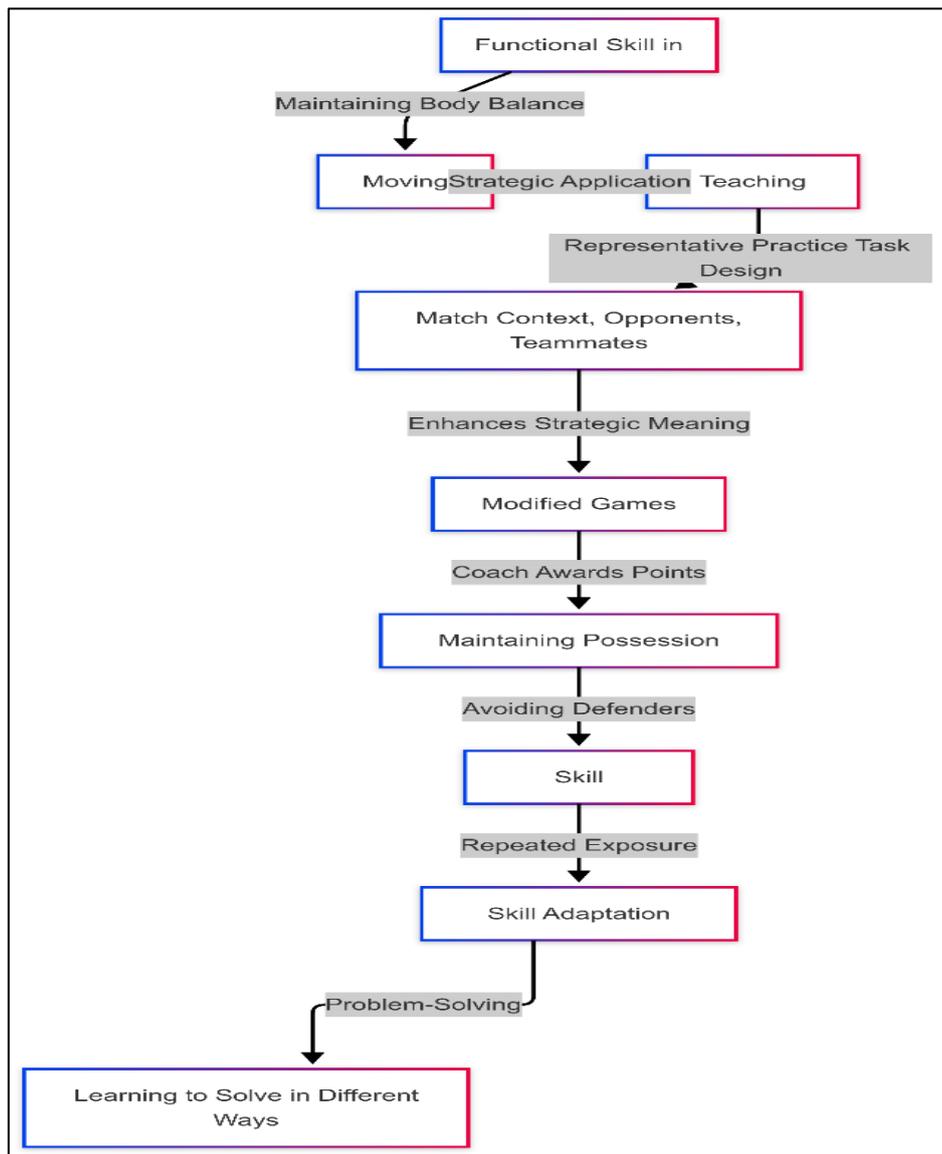


### Principles of sport

A crucial aspect of kabaddi is maintaining control and balance while in motion, specifically in terms of body positioning while running. Developing effective dribbling skills in young players requires establishing an environment. Conducive to repetitive practice while also ensuring students grasp the dynamic nature of movement in relation to the game context, opponents and team members through thoughtful task design. Removing the moving action from its original context and purpose (i.e., Moving the body toward a stationary cone or back) diminishes its significance and meaningfulness to the player. Modified games provide an opportunity to better utilize this skill as a strategic approach. For example, the coach could give points to players who successfully keep the ball while fending off defenders for specified lengths of time. By doing this, players would be repeatedly confronted with the issue (such as being required to sustain possession) but in a manner that enables them to develop various solutions (for a more in-depth understanding, consult the second case example in ...

### System Thinking

From an ecological dynamics perspective, athletes and sports teams can be considered complex adaptive systems. The implication is that system behavior is perceived as nonlinear, where alterations in system characteristics yield disproportionate outcomes in terms of system behavior. Considering this, practice tasks must be relevant to the roles of the performers. Such practice tasks must encourage Systems thinking and conceptualization by permitting the performer to visualize how their skills or the skill in question fit into a comprehensive network of relationships. When an individual learns to paint, they must comprehend how specific brush strokes and color ranges can be used to form a distinct, larger image. Practice designs should enable learners to grasp how a skill to be acquired can be integrated into, or influenced, a broader system of behavior.

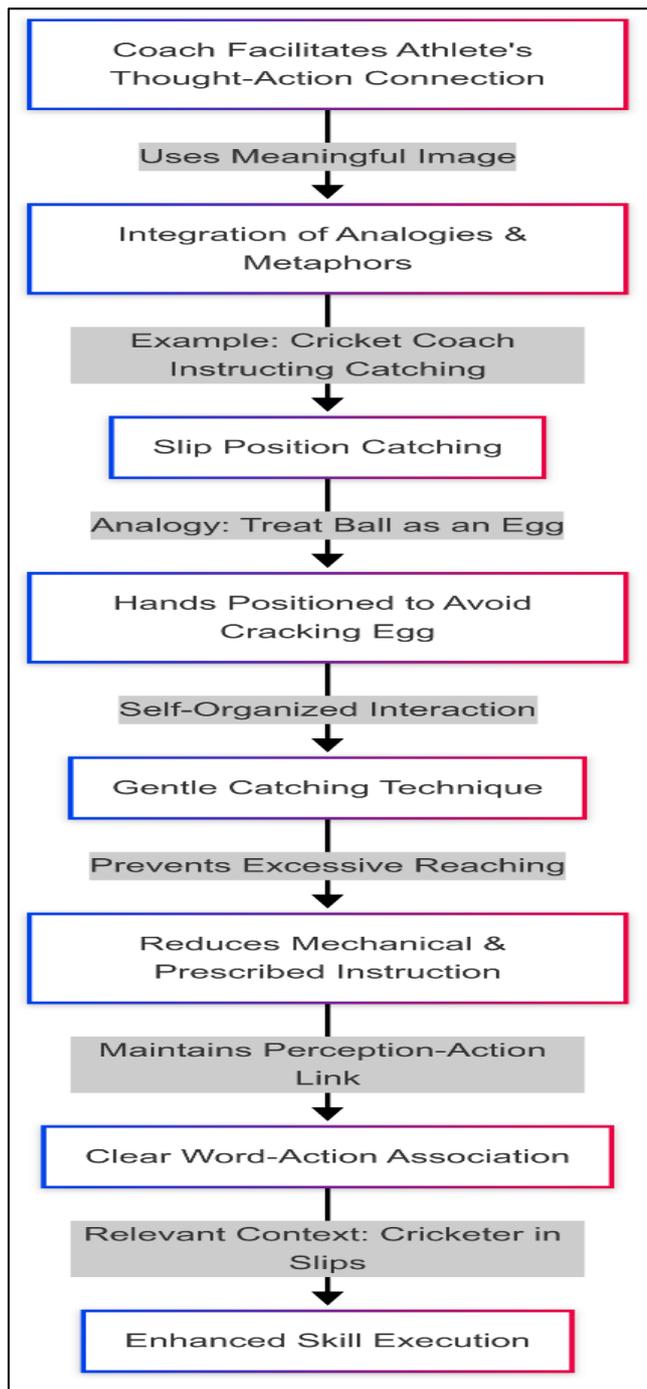


**Principles of sport**

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**Meaning as an Action Image**

Analogy and metaphors can significantly enhance human learning by facilitating deeper understanding. A rugby league coach may instruct a player to "refine their tackling technique," thereby imposing an informative constraint that enables the player to connect the action to a relevant context. A person's understanding of an object typically stems from individual experiences rather than broad generalizations or theoretical ideas. Gee reinforced this idea in designing effective video games, pointing out that "words and concepts are most meaningful when they are directly linked to perception and action within the real world". Contextualized learning designs should be aligned with their intended purpose so that performers can explore and interact with various elements of their performance environment. The objective of the practitioner is to design practice tasks that are highly informative, situating action within a context of precise meaning pertinent to the individual performer..



### Principles of sport

A coach can enhance an athlete's ability to connect their thoughts with their actions by employing a significant image as a catalyst, which is achieved through the strategic combination of analogies and/or metaphors. When teaching a novice how to catch a ball in the “slip” position, a cricket coach may advise them to align their hands around the ball as if it were an unbreakable egg. An analogy based on its original purpose for a young cricketer might lead them to arrange their interactions with the ball in a way that minimizes the risk of catching it too forcefully, which may otherwise be caused by direct and rigid instructions that encourage over-reaching or over-grasping. The analogy establishes a connection between perception and action by directly correlating words with a particular action (catching an egg) and placing them within an appropriate environment, such as a cricketer in a slip poised to catch a ball.

### CONCLUSION

Modern perspectives on sports learning and performance incorporate interdisciplinarity by integrating ideas from various disciplines to develop innovative methods that transcend traditional approaches. This development has led coaches to view themselves as designers, resulting in the creation of practice tasks that facilitate interactions between athletes and their environment. This study applied 08 key principles related to effective video game design to demonstrate how these principles can be implemented in a sporting context to assist coaches who consider themselves learning environment

designers. It is essential that skills are repeatedly practiced in a manner that allows the individual to gain a more in-depth understanding of the relationship between the skill being learned and its environment. They proposed a form of repetition that does not repeat itself which is consistent with nonlinear teaching methods, such as those found in constraints-led approaches. Additionally, each of these principles is interconnected and should be considered together rather than separately when creating training exercises for athletes. An athlete can be motivated to collaborate in designing a training task that presents them and/or their teammates with pleasant yet challenging puzzles to resolve within a controlled or simulated environment.

In summary, we identify several key connections that unite each principle discussed. Each principal center This approach places the performer at the core of the learning process and emphasizes the importance of self-discovery. This approach encourages performers to be creative and develop new ideas through carefully designed practice sessions. Ultimately, this results in the development of an autonomous athlete—that is, an individual who learns to control his/her own perceptions, emotions, cognitions, and actions as he/she adapts to the diverse dynamic environments encountered in sport.

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