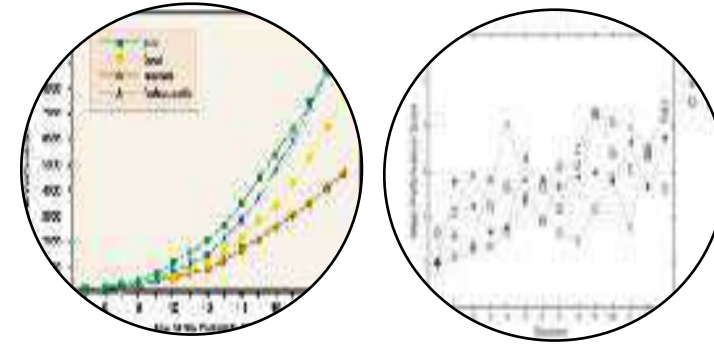


LEARNING ENVIRONMENTS

RICHARD SHUTTLEWORTH

Designing Learning Environments



SEARCH

Trial & Learn

Large Task & Solution Space

High Movement Variability

Exploration

Information Detection

DISCOVER

Encourage Consistency

Smaller Solution Space

Reduced Movement Variability

Refining

Relevant Information

EXPLOIT

Functional Change

Change Time & Space

Optimal Movement Variability

Adaptation

Switch between Information

Movement

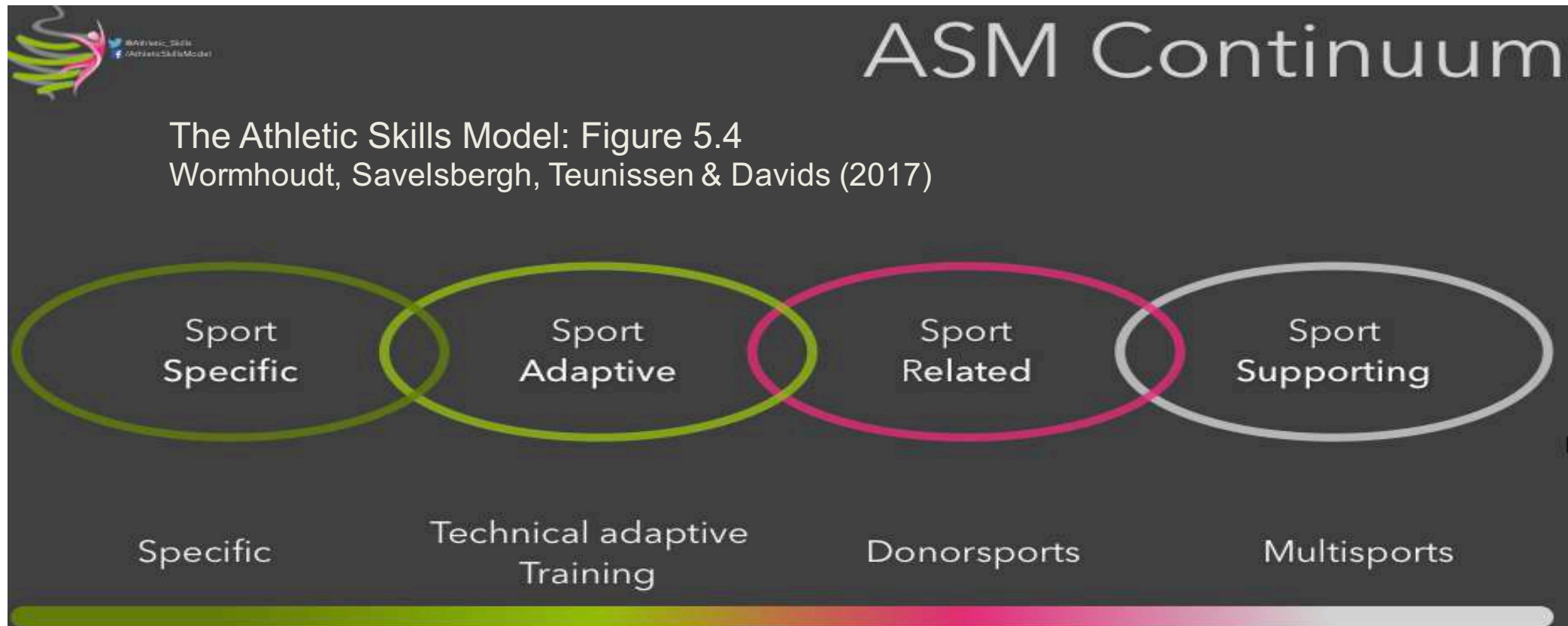
information action systems



[Movement]
coordination
differentiation
balance
reaction
synchronise rhythm



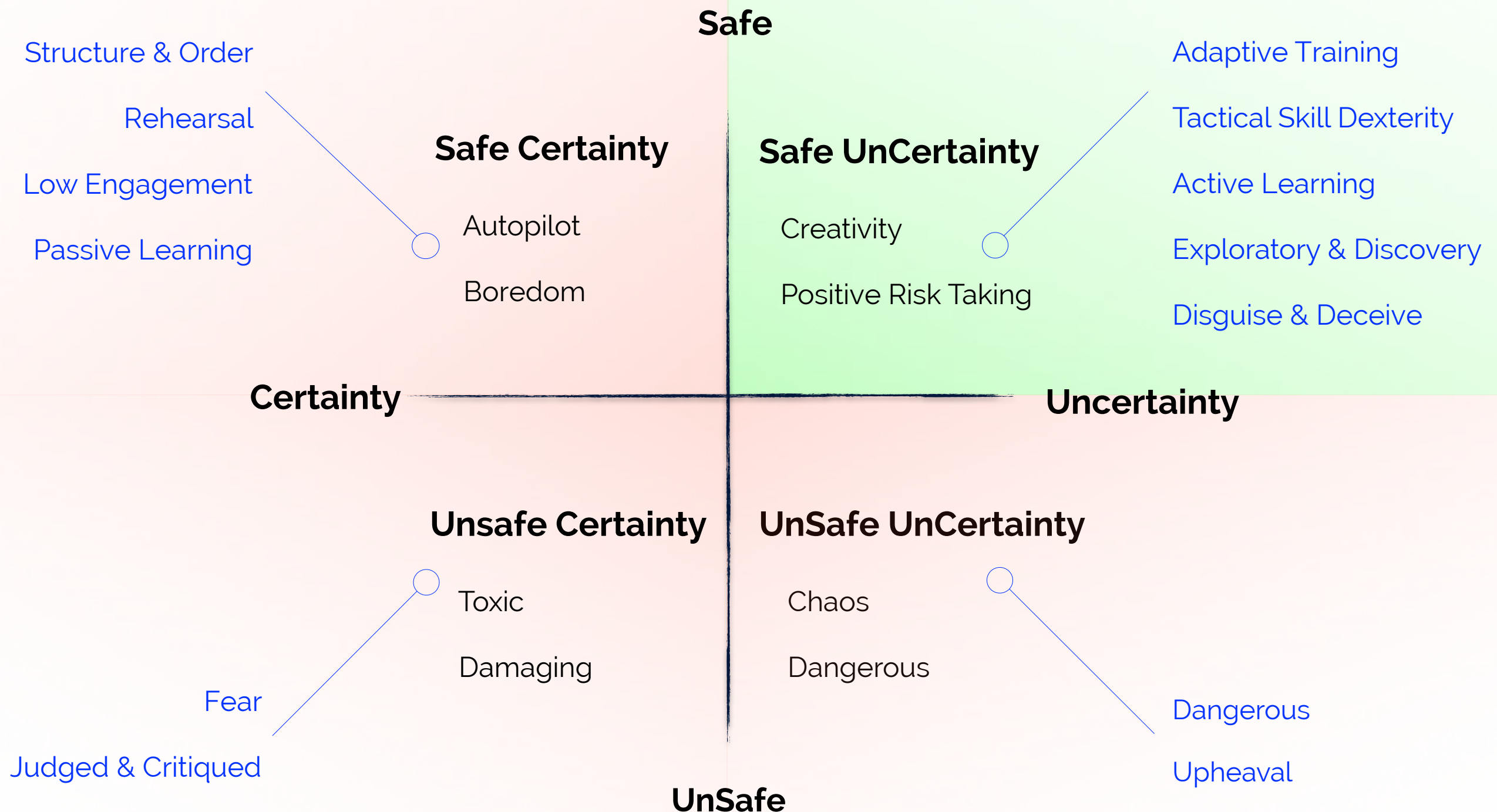
Benefits of Donor Sports



Designing

Adaptive Training Games

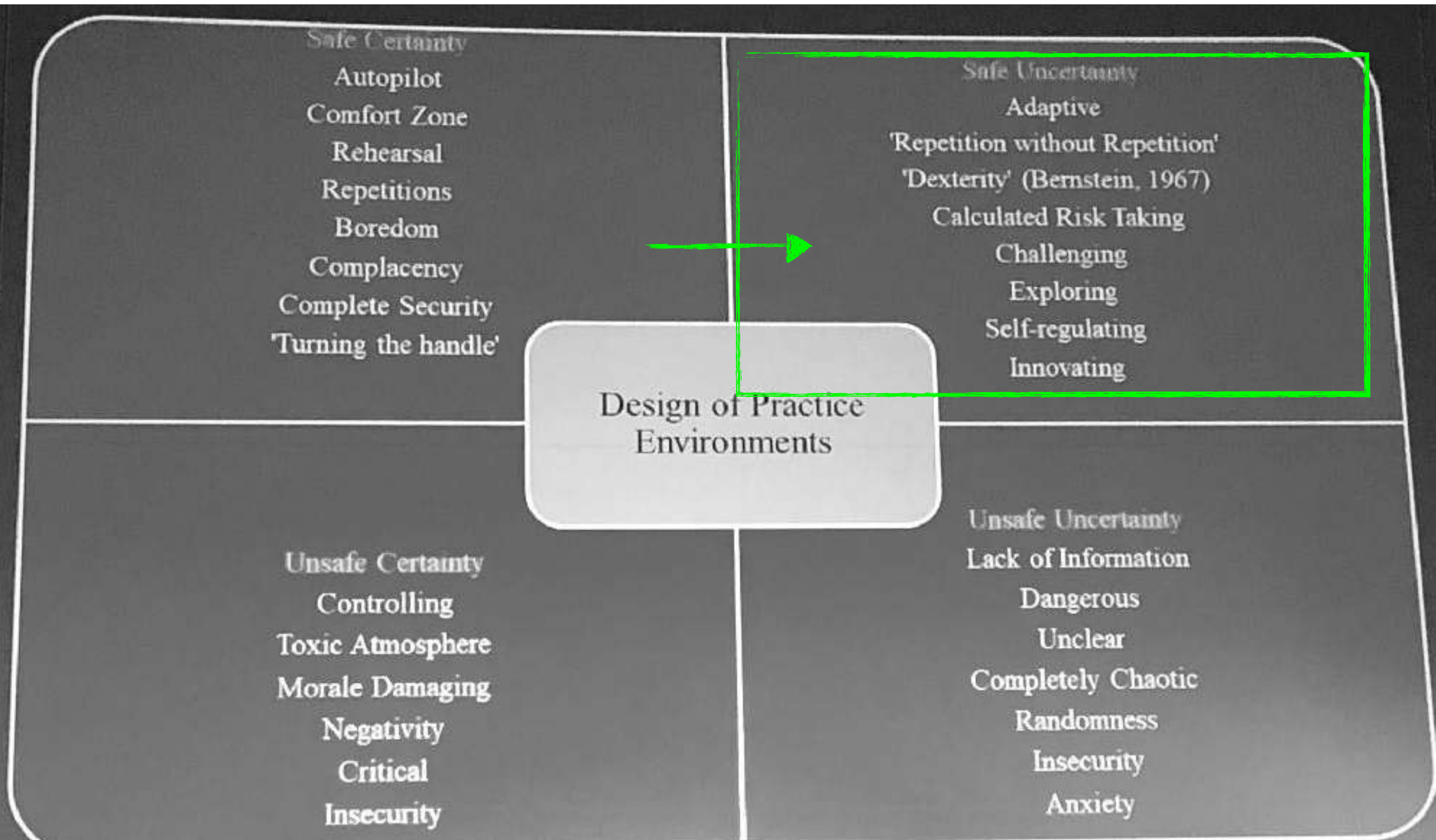
Dauids, Bickley, Rogers, Shuttleworth & Brown, (2018)



Designing

Adaptive Training Games

Dauids, Bickley, Rogers, Shuttleworth & Brown, (2018)



Designing Learning Environments

FREEDOM - giving responsibility

EMPOWERMENT - player feels in control

NO FEAR - not afraid to make their own decisions

ENGAGEMENT - high levels of task involvement & inclusion

SUPPORTIVE - facilitatory role in supporting a players actions & decisions

Learning Environment



CREATIVE - allowing player capabilities to be fully explored and expressed

SAFE - safety to explore without always being critiqued and judged

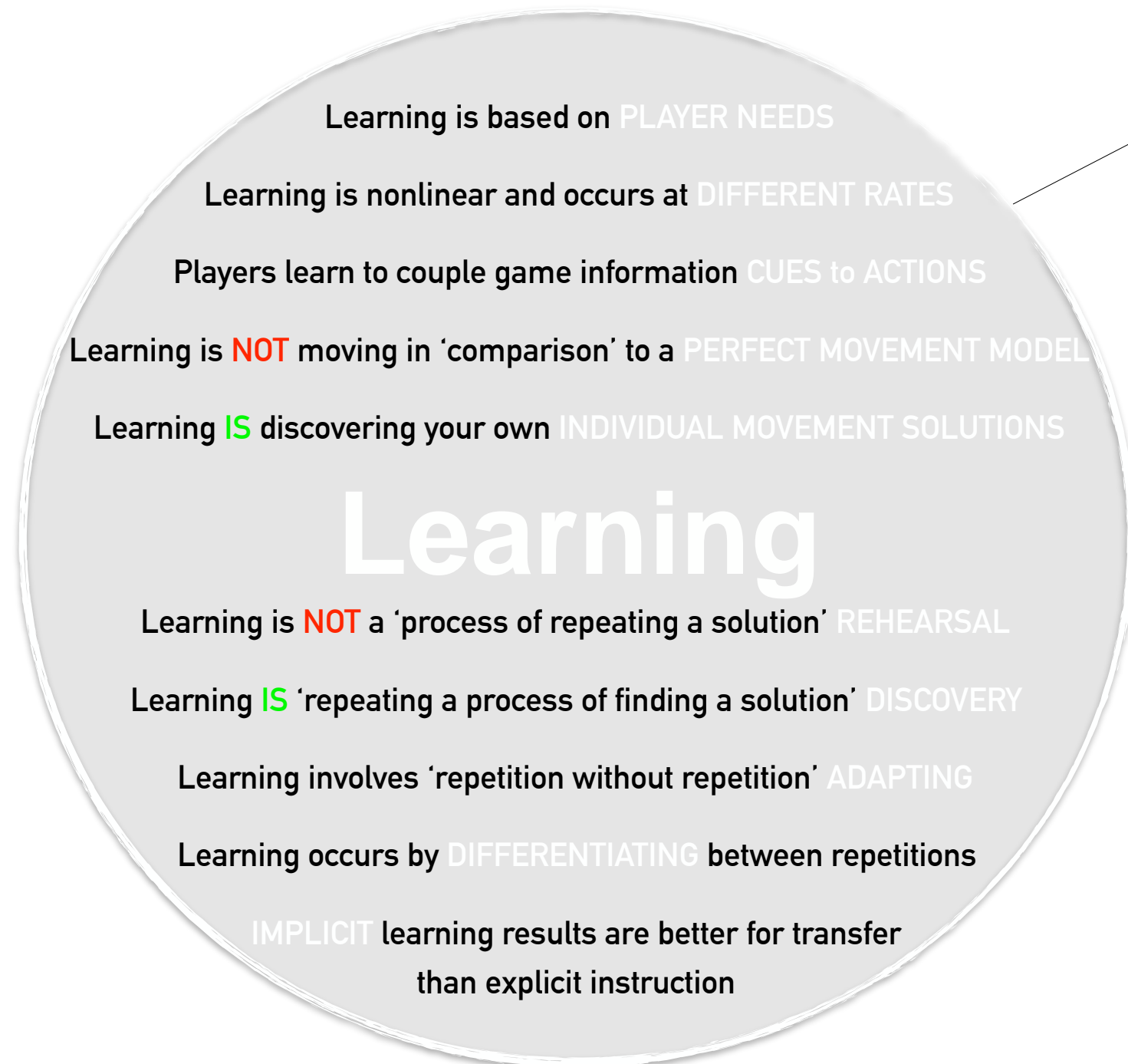
AMBITION - helping shape player intentions to want to play

FUN - having fun leads to a motivation to learn

SOCIAL - interaction between players

PLAYERS LEARNING JOURNEY

Learning



Learning Environment

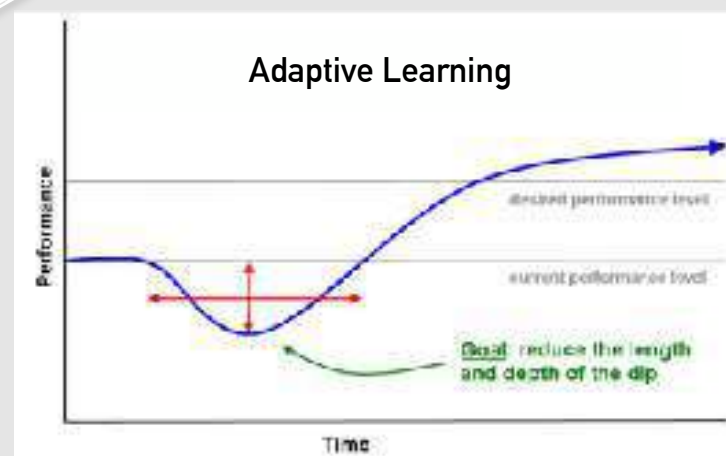
TEAMWORK
RESPECT
ENJOYMENT
DISCIPLINE
SPORTSMANSHIP

PLAYERS LEARNING JOURNEY

Learning Pit



Learning Environment



Learning Pit

High Instability in player Actions and Outcomes VARIABLE PERFORMANCE.

FAIL = First Attempt In Learning FAIL is FAILING to ADAPT
MESSY Practice = NEAT Performance.

Skill learning and transfer is ROBUST & ADAPTABLE

Being Comfortable in the UNCOMFORTABLE

Design Tactical Problems to shape player
LEARNING MOMENTS.

TEAMWORK
RESPECT
ENJOYMENT
DISCIPLINE
SPORTSMANSHIP

Performance Development Needs

Performance
Development

Identify performance related problems at various skill levels

Performance
Development

Identify performance related problems at various skill levels

Performance
Development

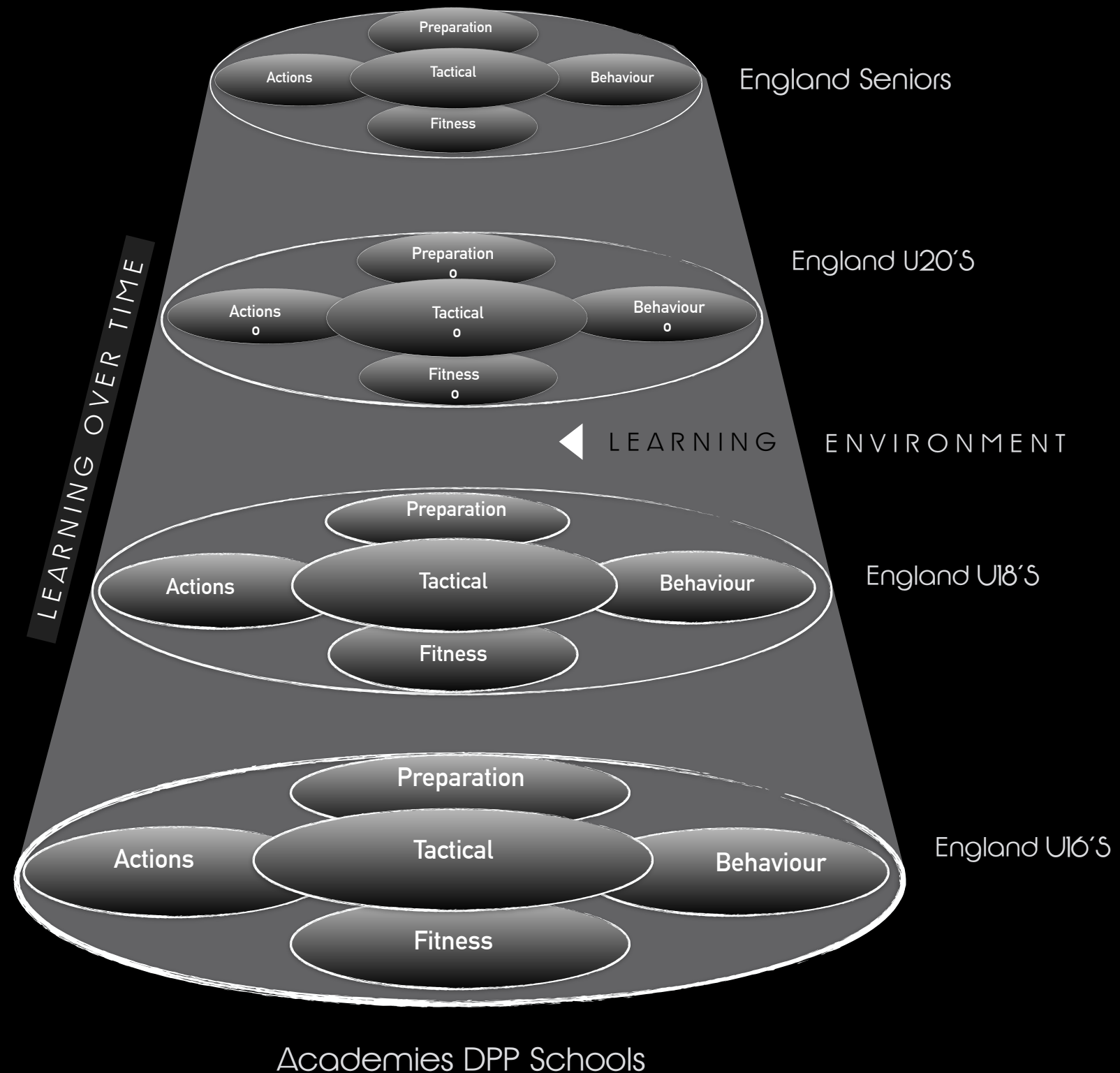
Identify performance related problems at various skill levels

Performance
Development

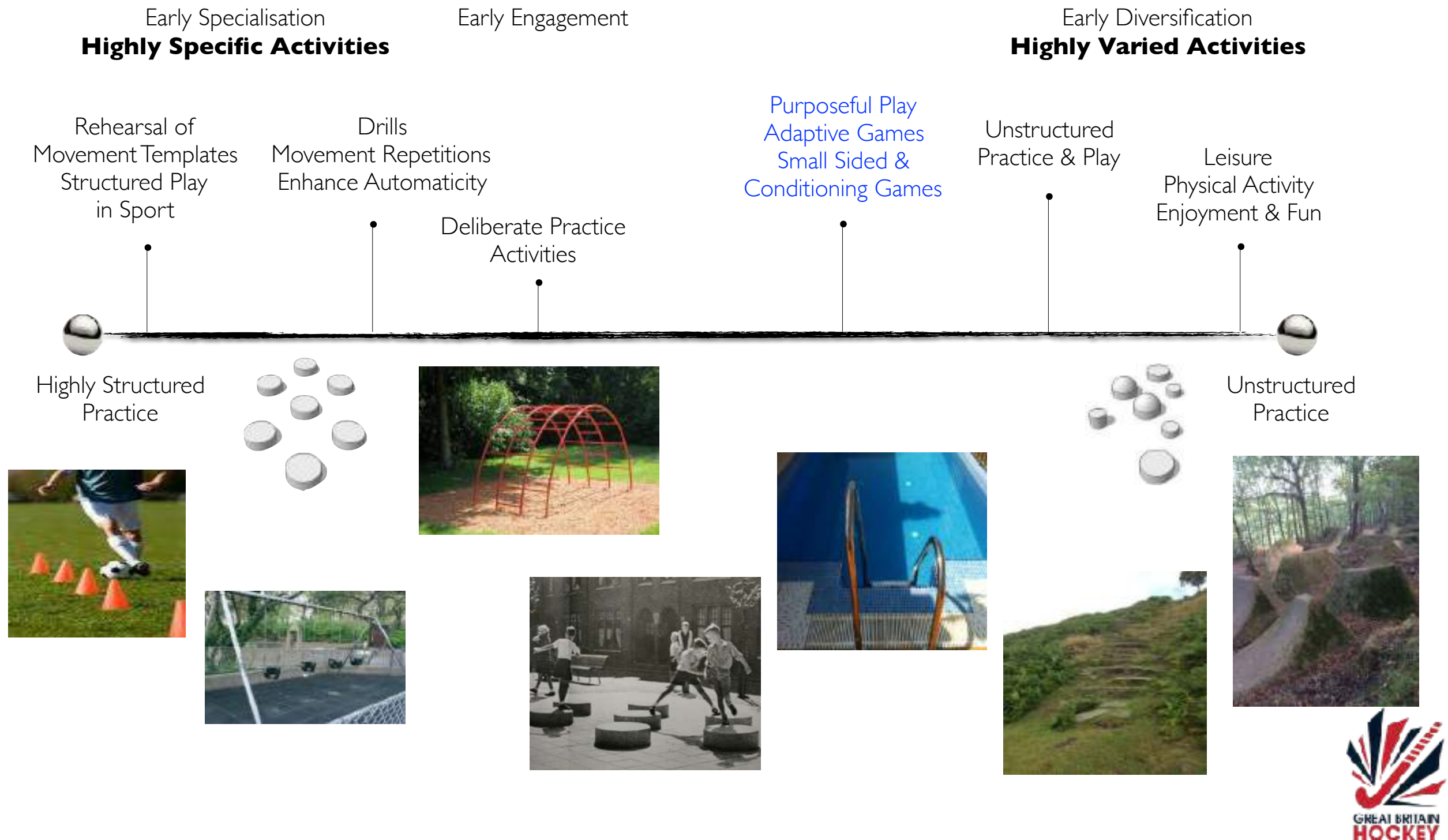
Identify performance related problems at various skill levels



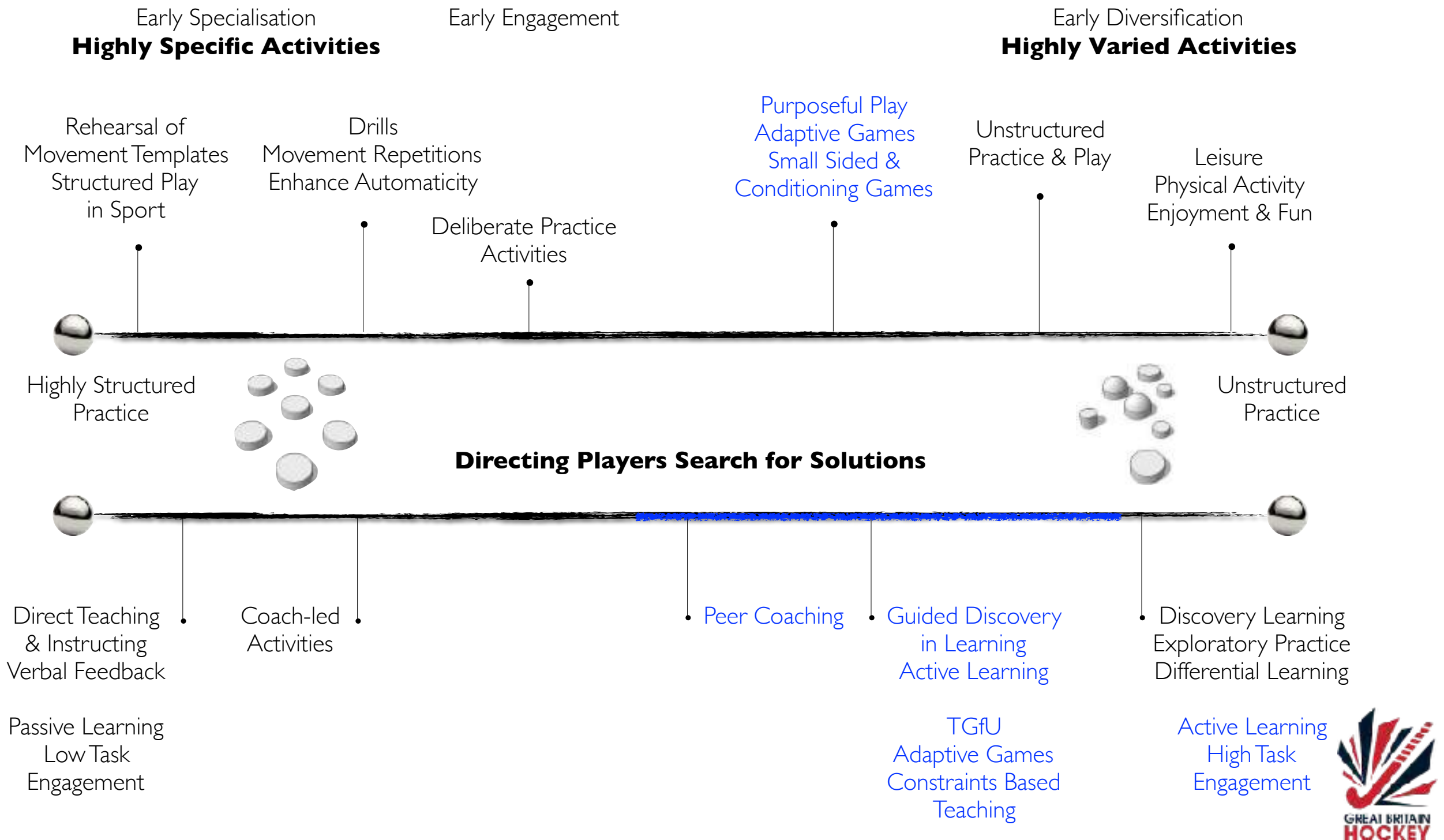
Integrated Development Framework



Macro & Micro Structure of Practice (Davids, Gullich, Shuttleworth & Araujo, 2017)



Macro & Micro Structure of Practice (Davids, Gullich, Shuttleworth & Araujo, 2017)



Specificity of Transfer

More time needed at Specific Transfer end at elite performance level



On Field Interactive Game Play Training



Low Interdependency

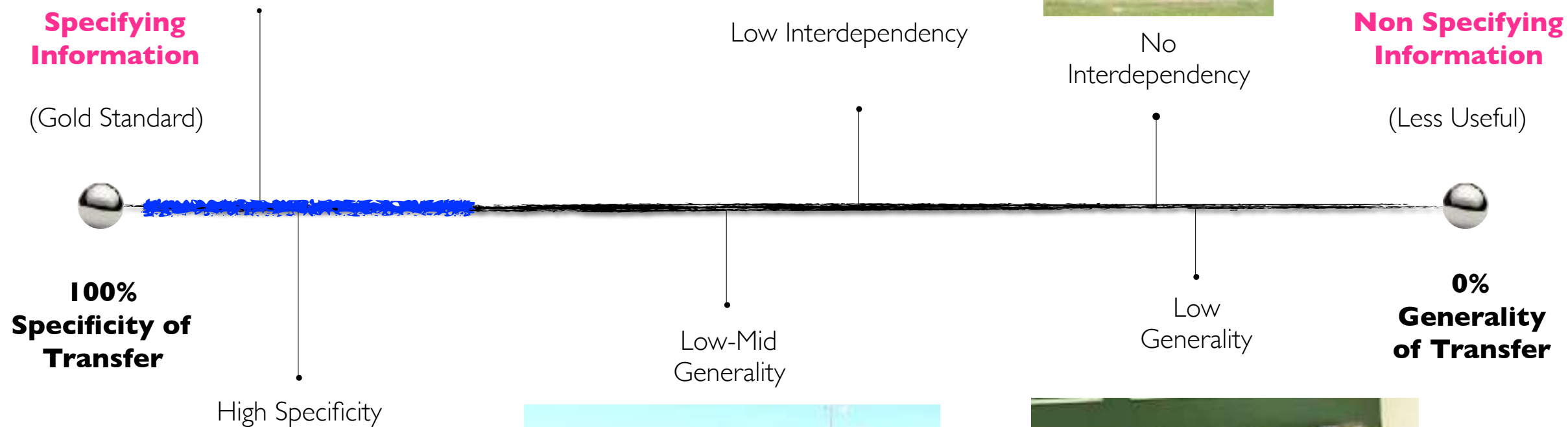


No
Interdependency



Non Specifying Information

(Less Useful)



ecological dynamics in sport

information action systems



 Exploratory Coaching

 Sailor Improvise Practice

Creating a Need



ADVANCED YOUTH AWARD CORE PRINCIPLES

1 THE PLAYER IS THE SYLLABUS



THE FUTURE PLAYER

HOW WE PLAY

PLAYER STRENGTHS AND AREAS FOR DEVELOPMENT

PLAYER PROGRAMMES



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ADVANCED YOUTH AWARD CORE PRINCIPLES

2 PRINCIPLES OF PLAY



APPLYING THE PRINCIPLES OF PLAY TO THE AGE AND STAGE OF DEVELOPMENT



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ADVANCED YOUTH AWARD CORE PRINCIPLES

3 PLAY AND PRACTICE



What is the most effective balance considering individual player needs, with respect to age and stage of development?



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ADVANCED YOUTH AWARD CORE PRINCIPLES

4 CONSTRAINTS BASED COACHING



Manipulating the interaction of player, environmental and task constraints to support player learning in games and training, on and off the pitch.



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FA ADVANCED YOUTH AWARD

Designing

Adaptive Skill Games with an Adaptive Mindset



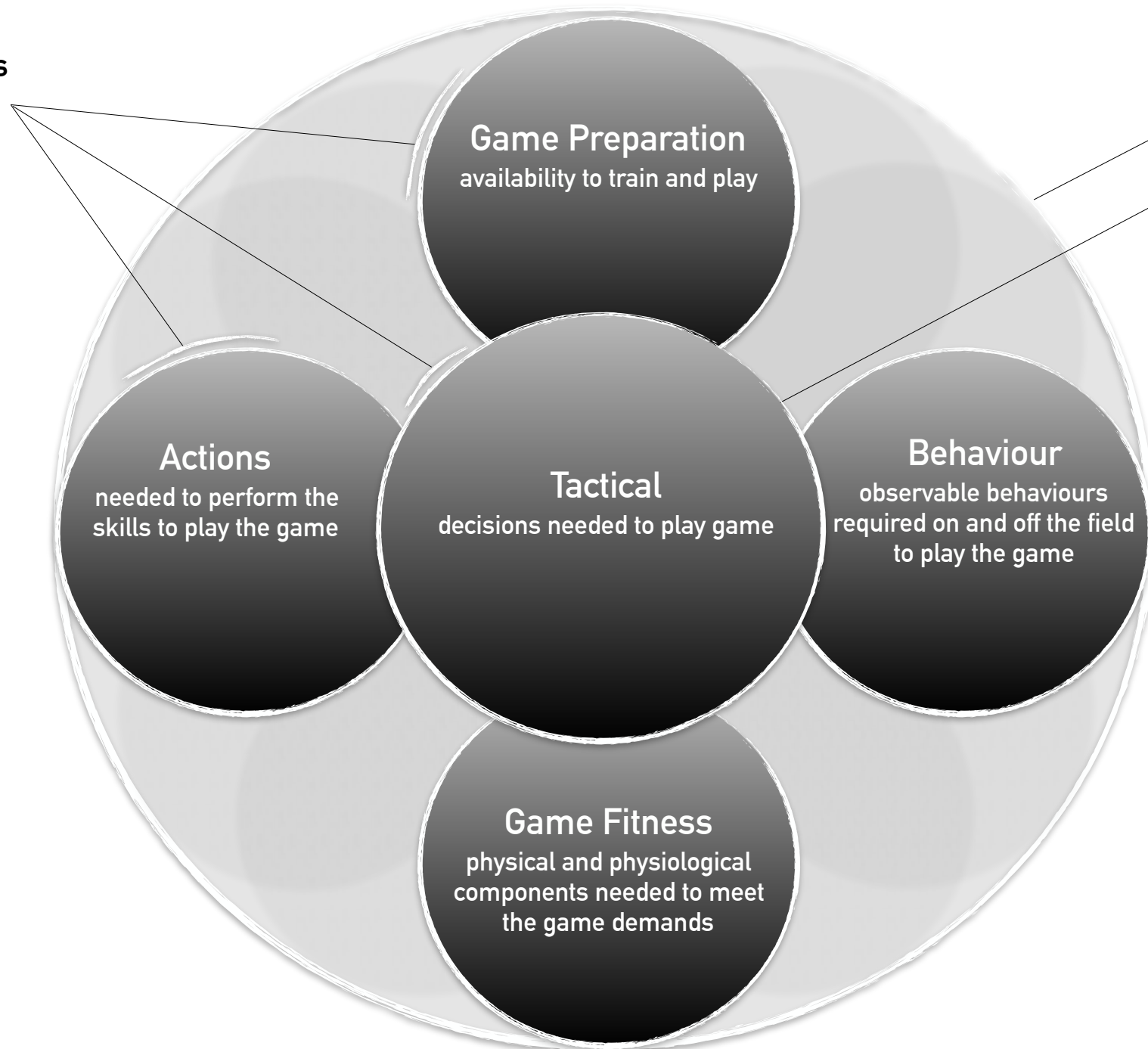
Former Head of Professional Coach Development



5 Components of Performance

Integrated Components

- Interdisciplinary
- Player Needs



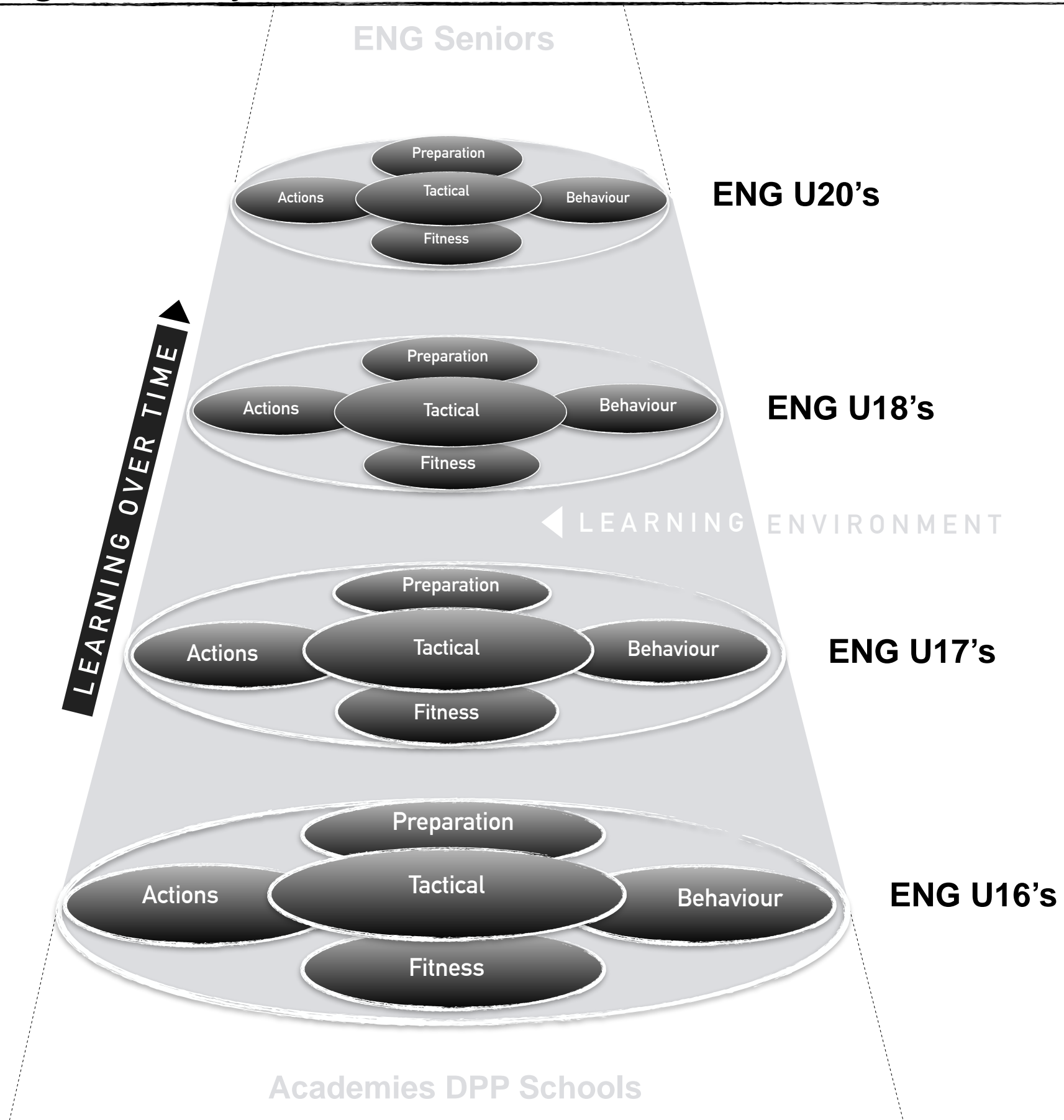
Learning Environment

Tactical Focus

- Game Centred
- Tactical Outcomes
- Decision Making
- Game Understanding
- & Skill

TEAMWORK
RESPECT
ENJOYMENT
DISCIPLINE
SPORTSMANSHIP

Player Learning Journey



Tactical Periodisation Concepts

- **No meaningful difference** exists between Super 16 teams in so far as **Quantity** of training that can be completed in-season, it makes sense to maximize the **Quality** of training so as to Gain a Performance Edge.
- **Target Training Intensity** for most Intense periods of Games and not the Average periods based on Analysis
- **Distort** the game - not mimic the game
- Instead of 'train like you play' adopt attitude of '**play like you train**'
- **Variation** of Training loads produces **superior results** to Monotonous Loads
(week to week periodised)
- As teams cannot maintain Peak Physical Conditioning for the entire length of season. Periods are planned for both **recovery and hard training** (vary Intensity)
- Dominant stress placed on players in field based, **weekly physical training time equates to around 90%** (tuesday & thursday)

Training Benefits

- Greatest **transfer** occurs from **training to competition** when skills and tactics are rehearsed in **similar physical and psychological stress** to those expected in competition (principle of specificity)
- Prevention of athlete **mental** and **physical ‘staleness’** (vary training but keep game principles same)
- Reduction of injury/illness which are syndromes of overreaching and overtraining
- Allows heavy training to take place that ultimately improves on-field **performance in finals**
- Go ABOVE game intensity to **improve skills** and to target physical (extensive/intensive endurance) qualities, either **running** and/or **contact** stress.
- Training at game pace we can maintain physical qualities, **but not attain them**. Furthermore, does **not improve skills**. Why we need distinction between **short and long** turn arounds.

IMPROVEMENTS IN COACHING METHODS

Challenges Facing Coaches

Performance Environment – ‘to win at the cost of learning & development’

Tradition & Culture – ‘resist changing our ways’

Overly Organise – ‘to minimise chances of losing’

Top Down Approach – ‘mimic parts of the senior game’

Peer Pressure – ‘perception from line managers, senior coaches, parents’

Time Constraints – ‘limited amount of time to sell so just tell’

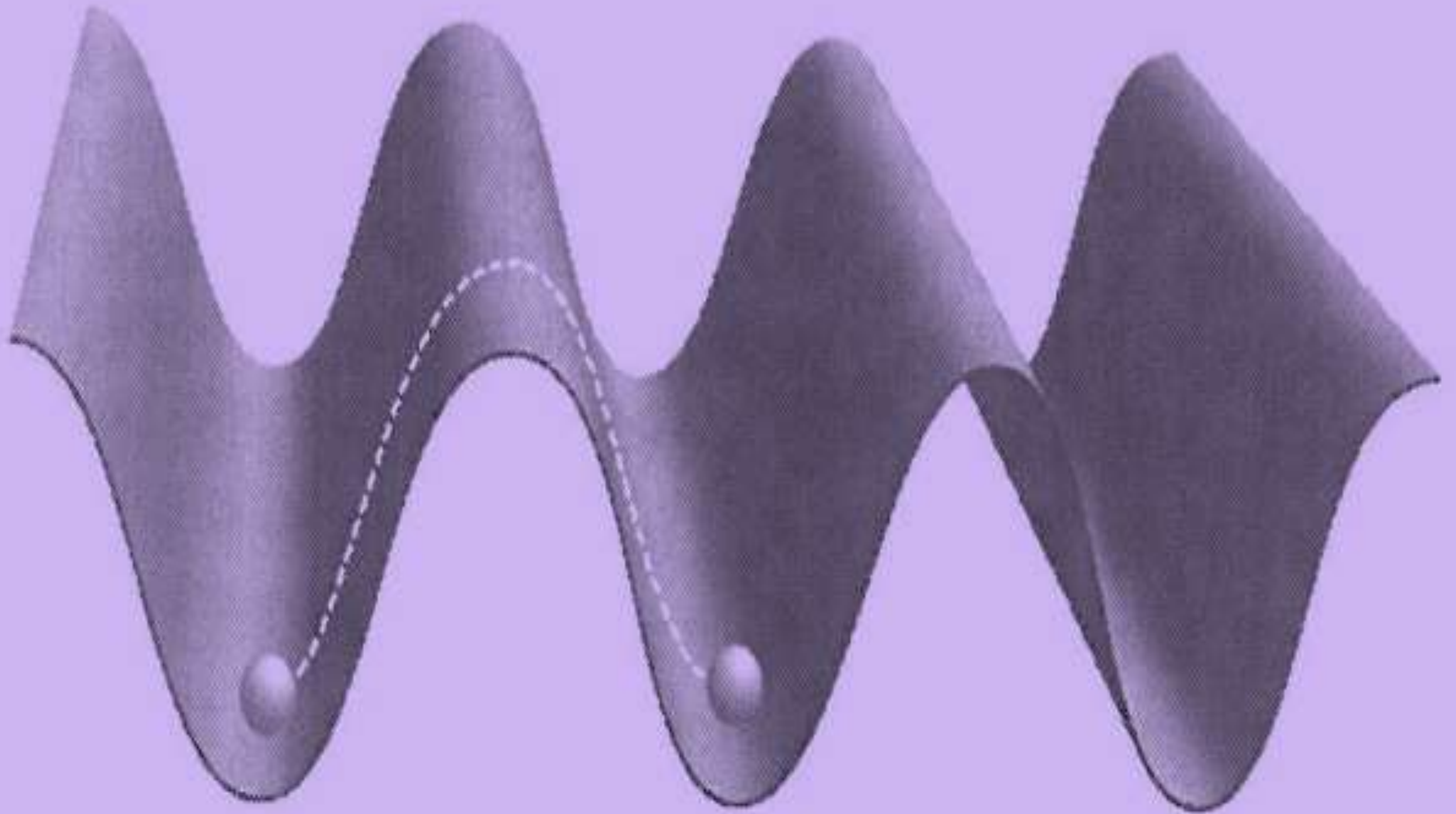
Overly Technical – ‘at cost of skill and decision making’

Locus of Control – ‘coach-led over player-centred learning environment’

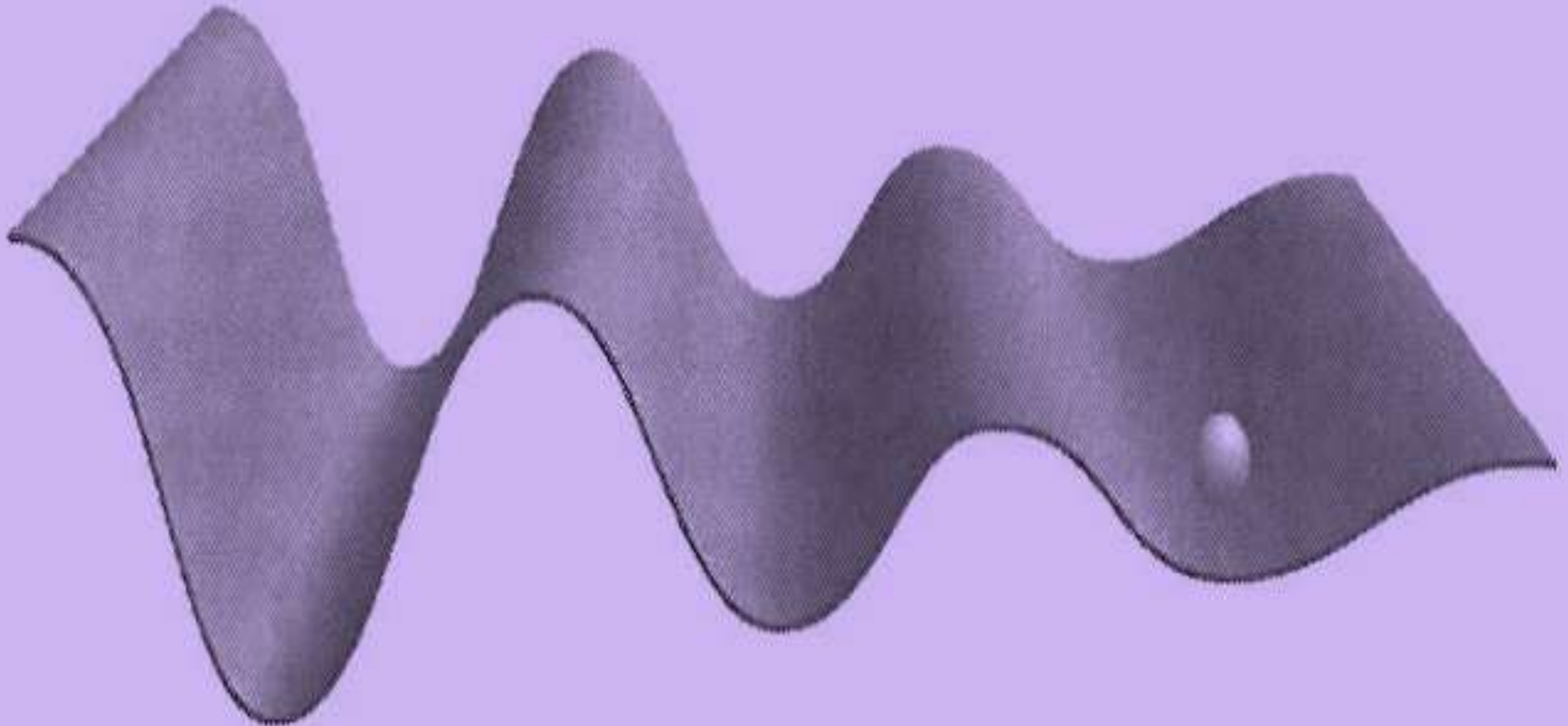
Terminology – ‘striking right back and making it meaningful’

Technology – ‘over datafication of learning and performance environment’

valleys provide movement stability and peaks movement metastability
engrained, rigid techniques

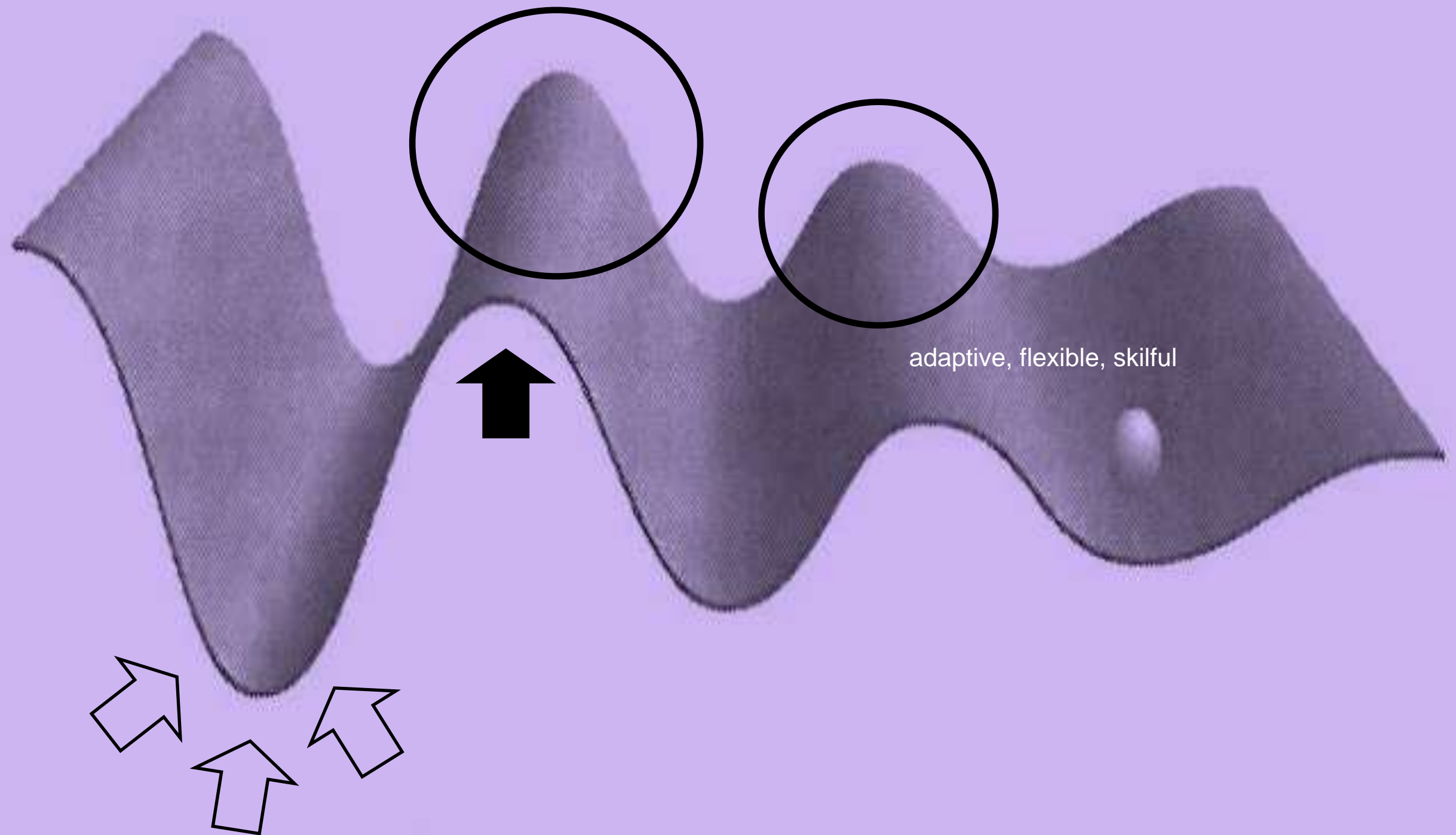


valleys provide movement stability and peaks movement metastability
robust, adaptive patterns



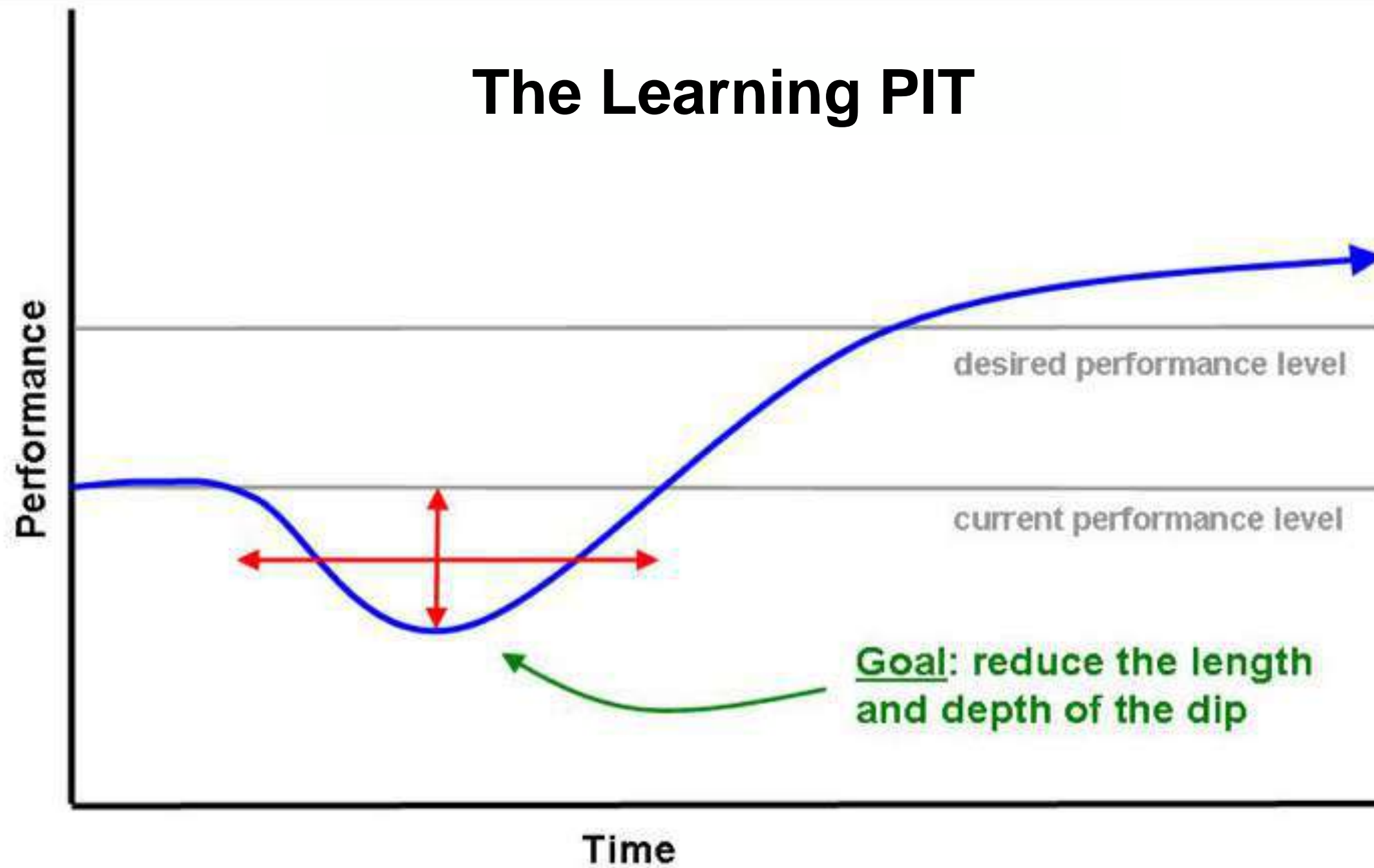
valleys provide movement stability and peaks movement metastability

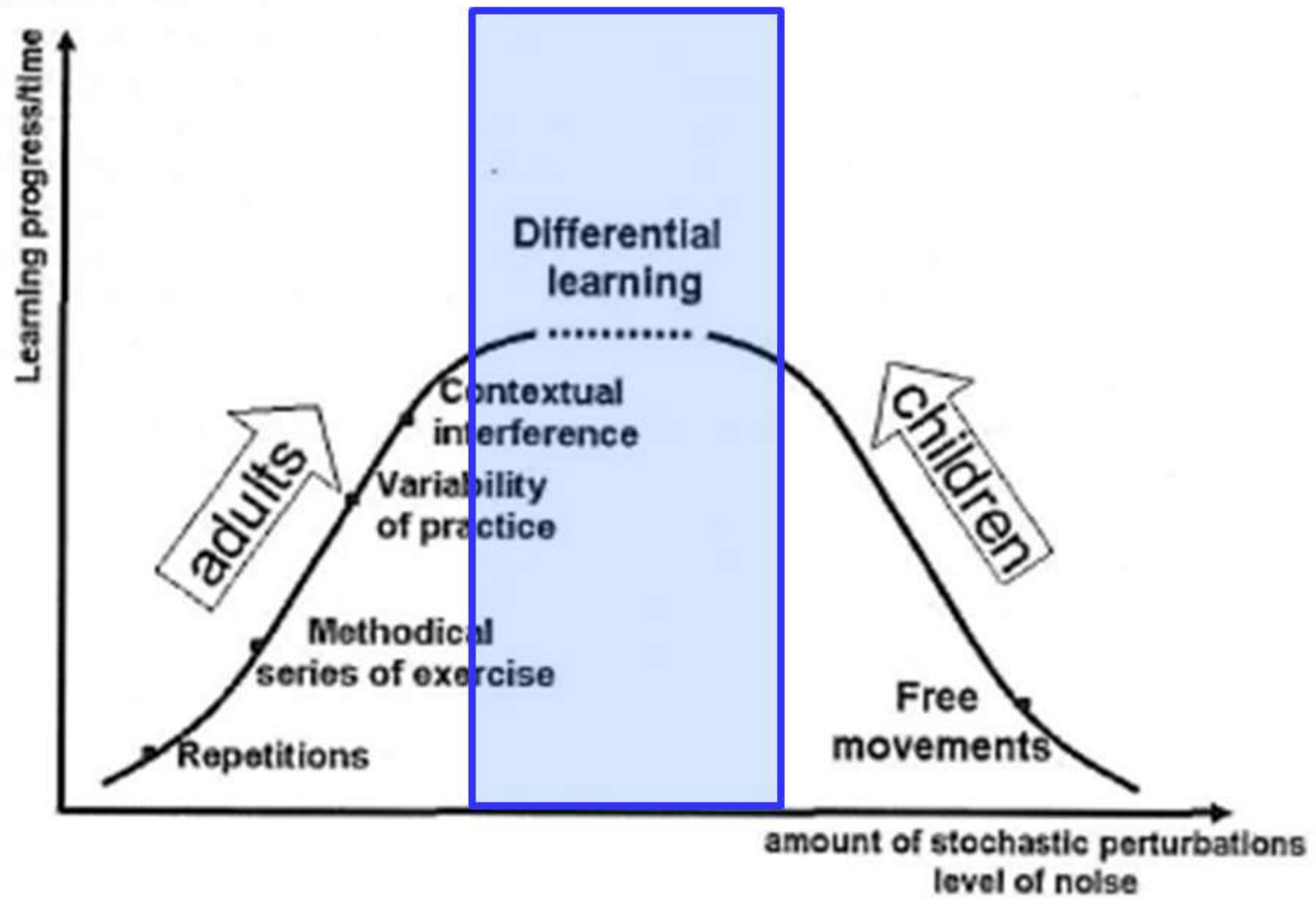
robust, adaptive patterns



adaptive, flexible, skilful

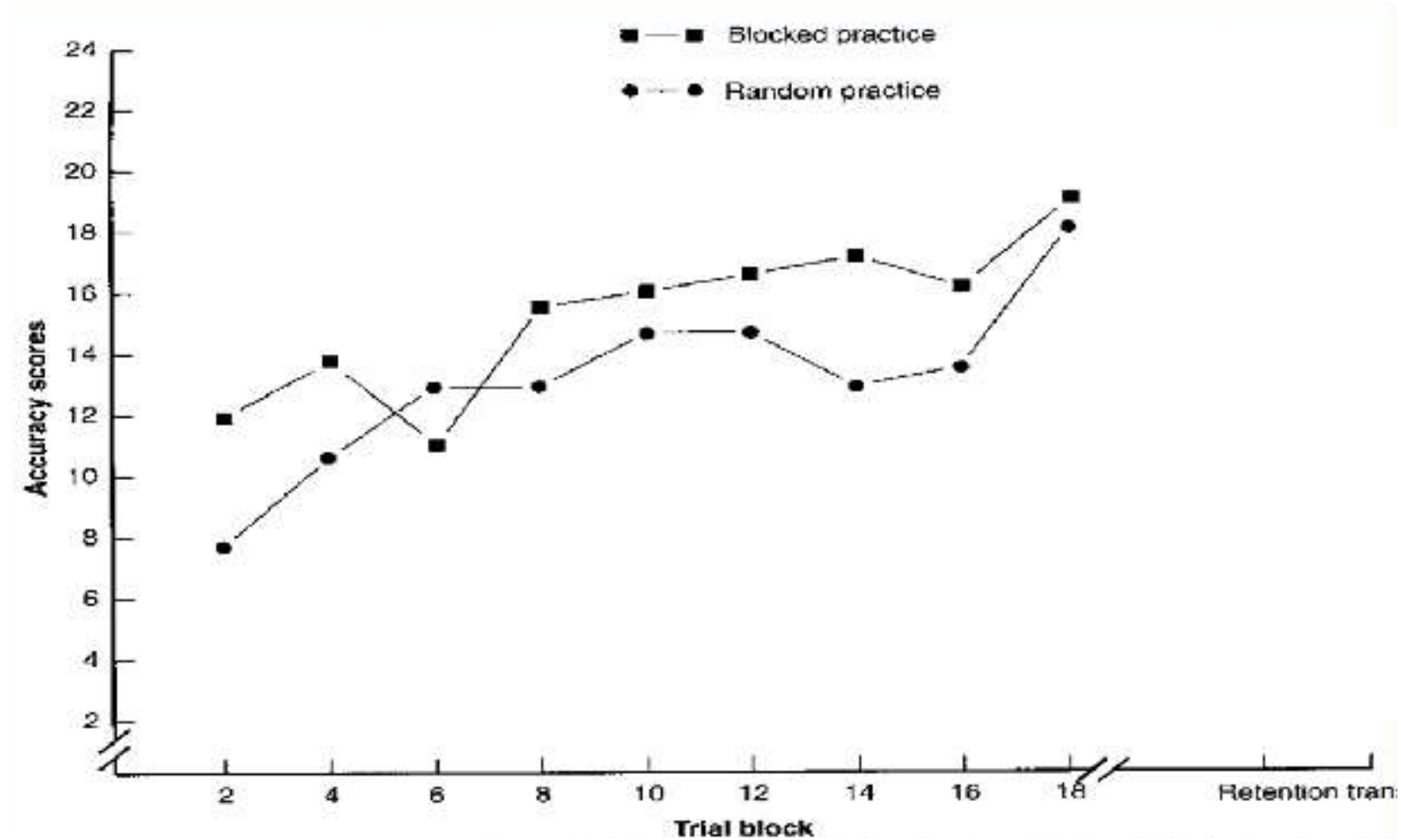
The Learning PIT



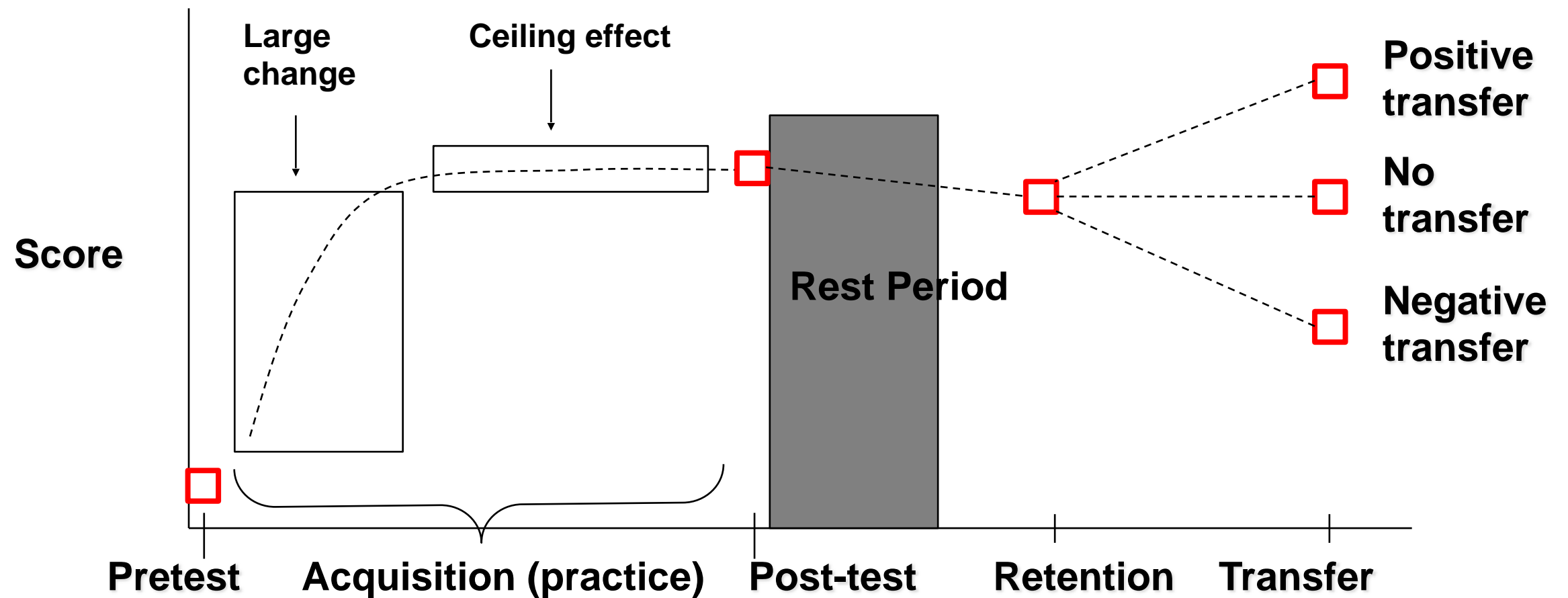


PRINCIPLES

PRACTICE VARIABILITY ON PERFORMANCE & LEARNING



Learning Taking Place?



**Implicit
Learning**

**Explicit
Learning**

**Movement
Form**

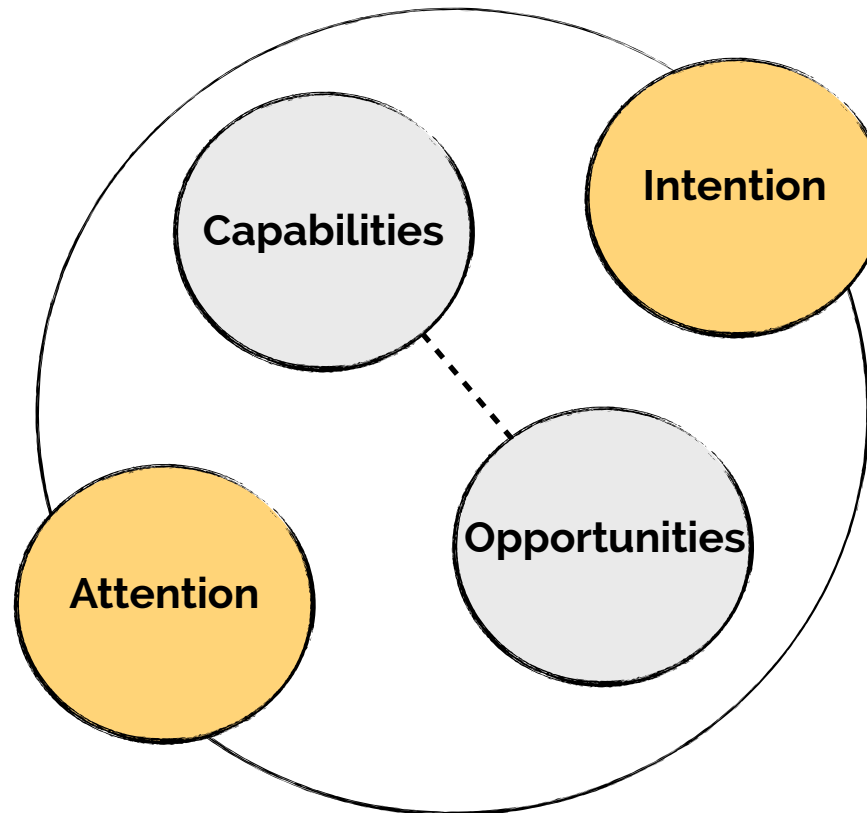
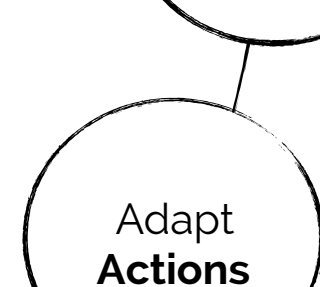
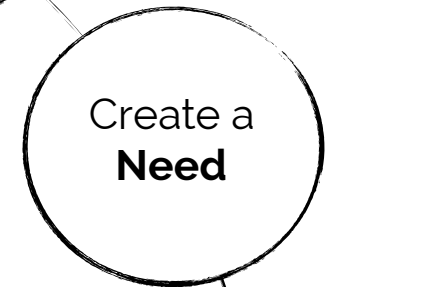
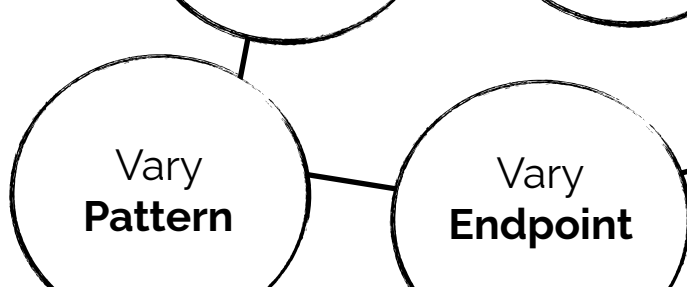
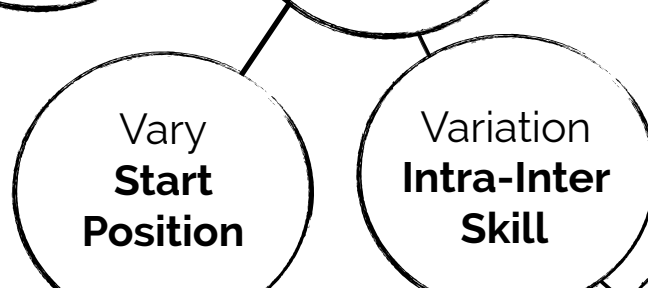
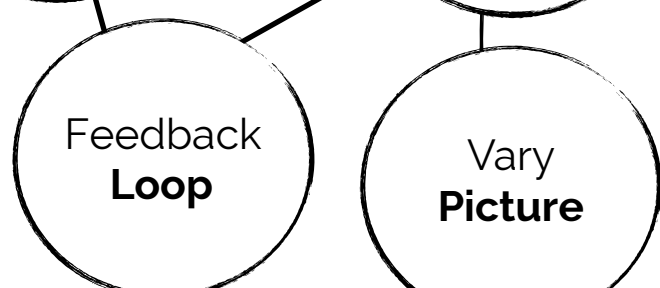
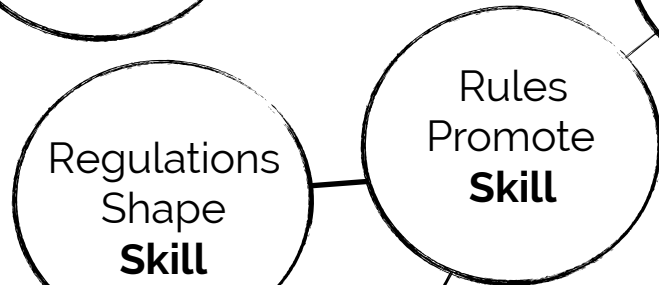
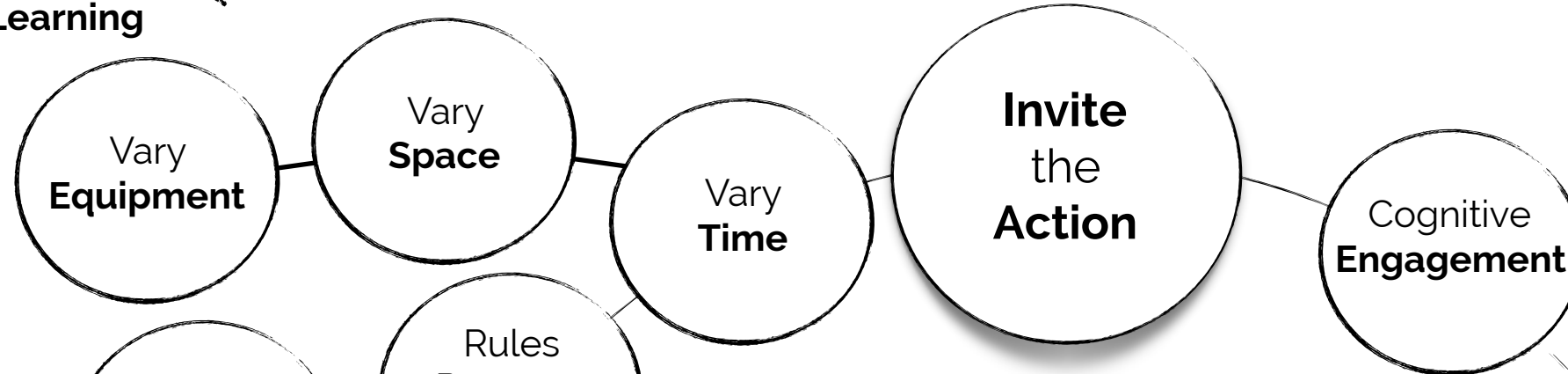
**Static
Cues**

**Movement
Effect**

**Dynamic
Cues**

**Certainty
Plan-Action**

**Uncertainty
Inter-Act**



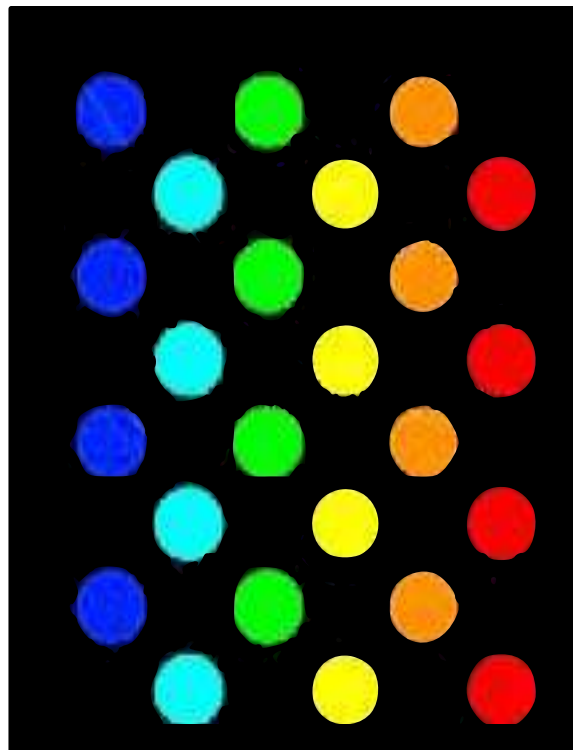
Feedback Loop

Amplifying the Problem



Olympic Archery

information action systems



ADVANCED YOUTH AWARD CORE PRINCIPLES

How Experimental & Empirical Knowledge Enrich Science, Application & Practice

Empirical Knowledge derives from theoretical ideas, experimental and other research, data and modelling work

Empirical Research Knowledge

Curiosity



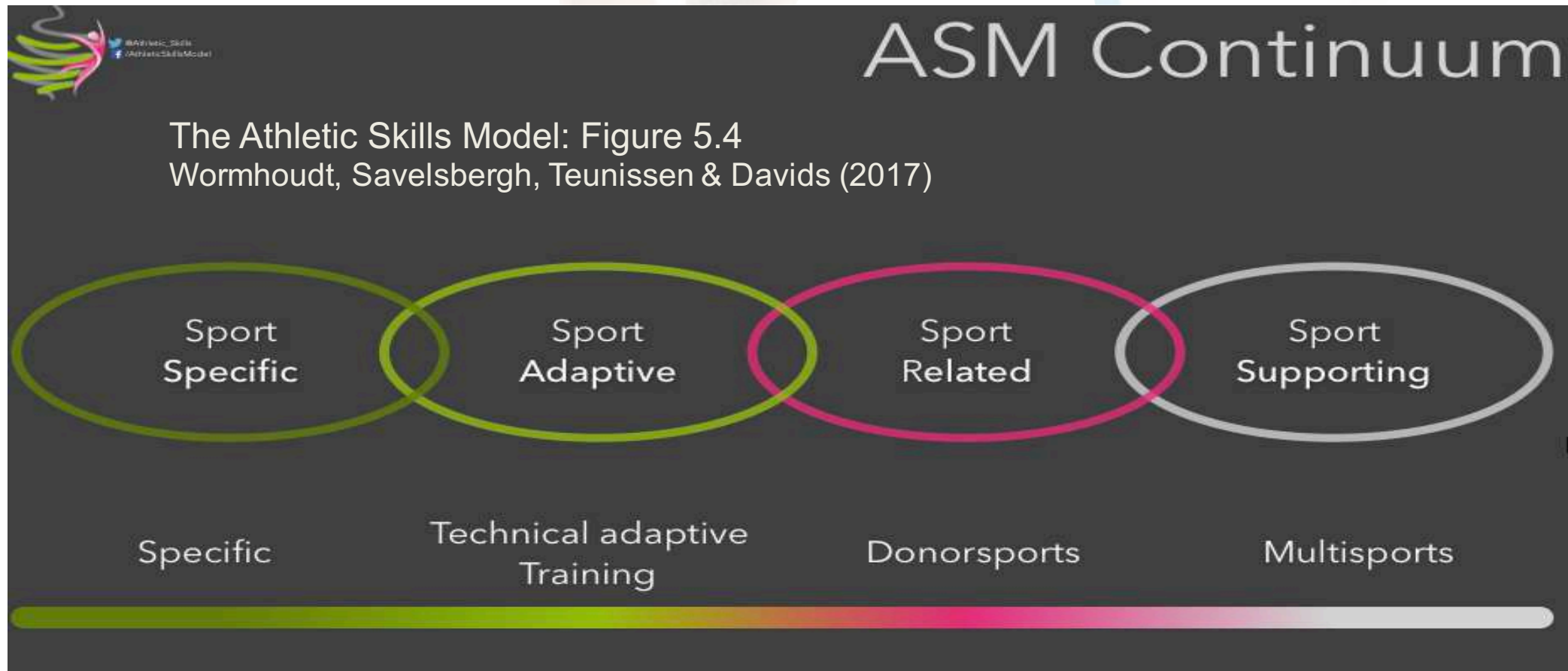
Curiosity

Elite Experiential Knowledge

Experiential Knowledge derives from daily interactions of coaches, players, sport scientists, teachers, trainers and performance analysts

Designing

Constraints to Afford



Donor Sport

Affording Specific Skill Transfer



Constraints Based Coaching & Nonlinear Pedagogy



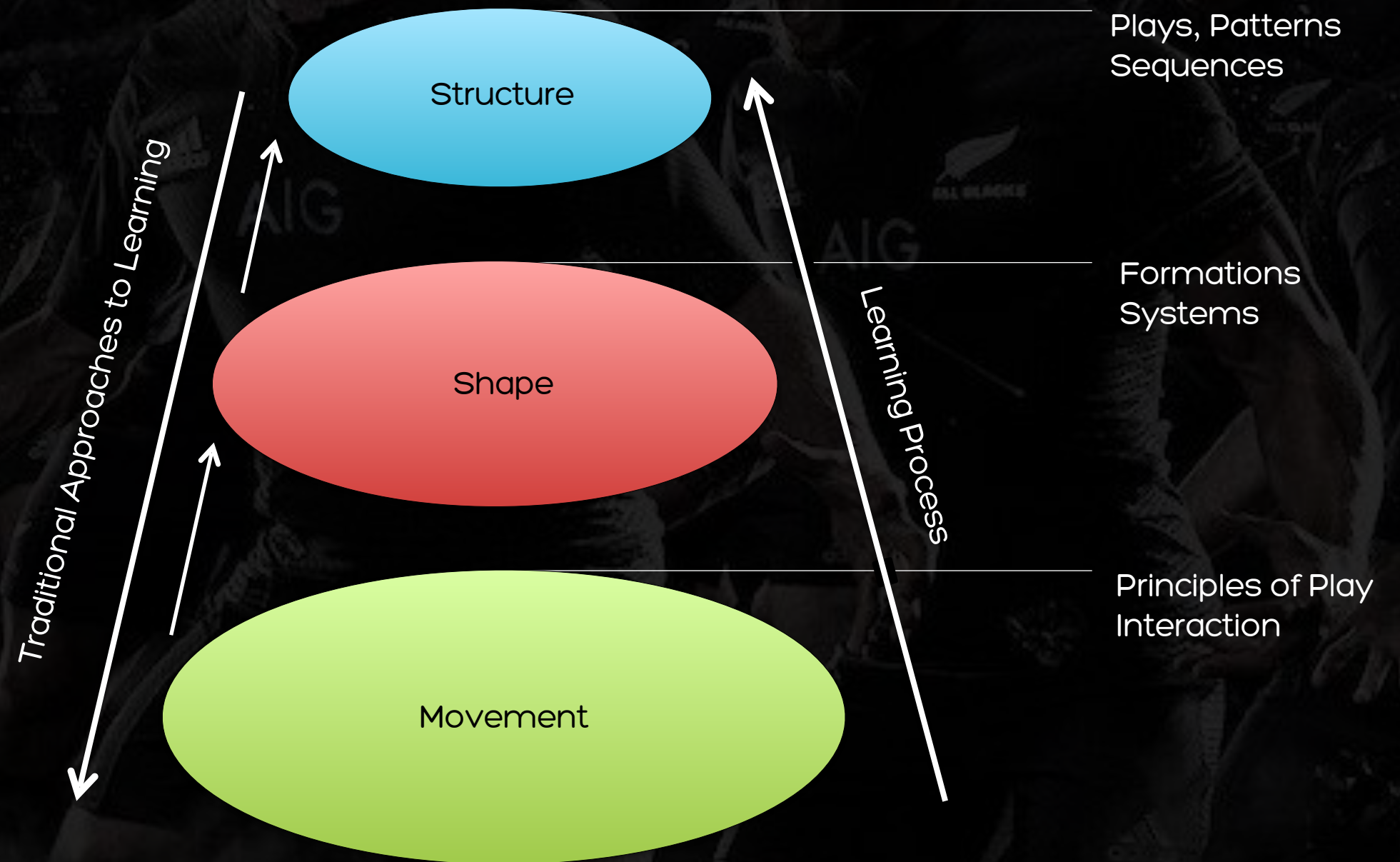
Constraints Based Coaching & Nonlinear Pedagogy



adaptive zone

inter-action

Shuttleworth, Davids and Brymer 2018

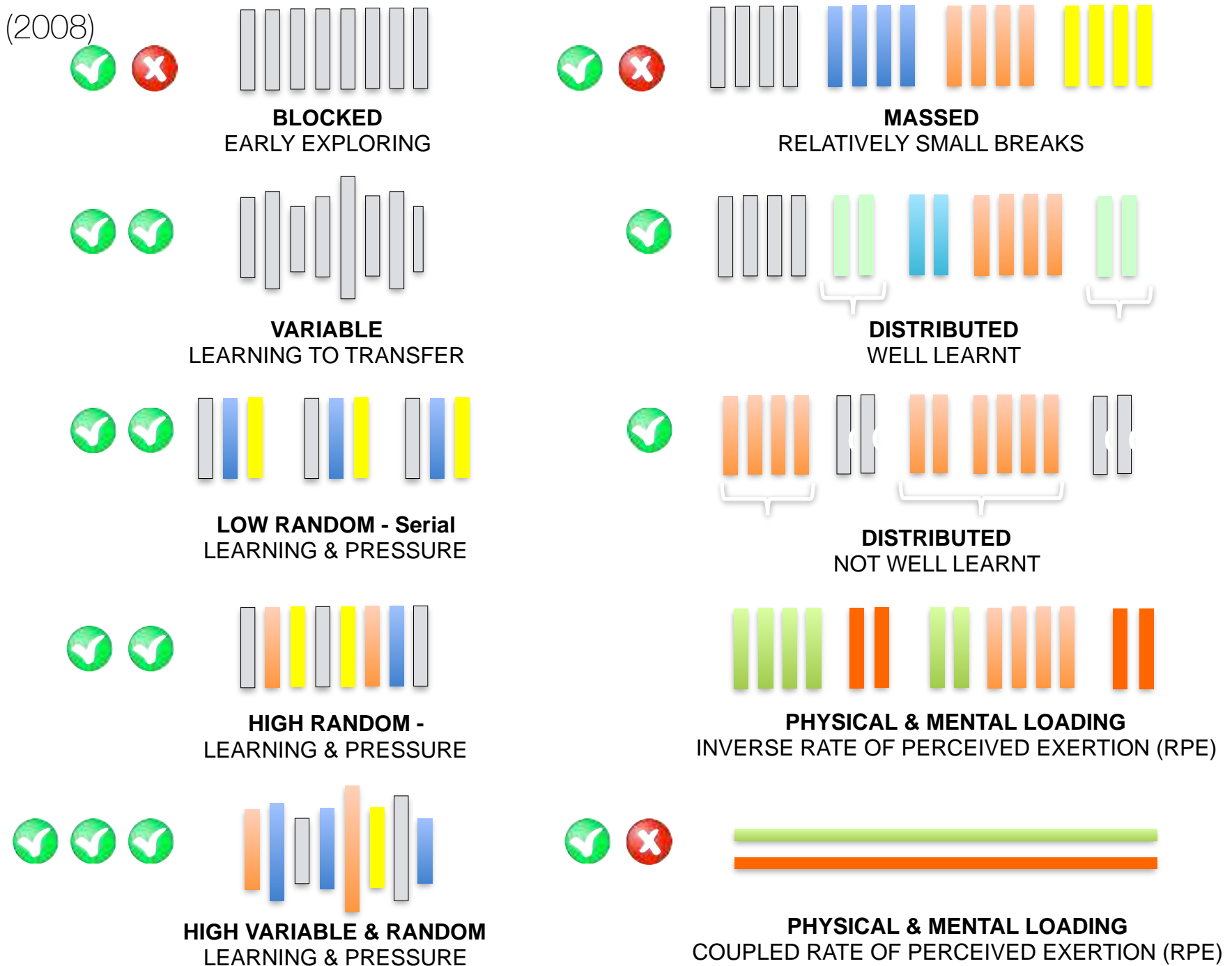


Skill Acquisition

Practice Structure

Structure

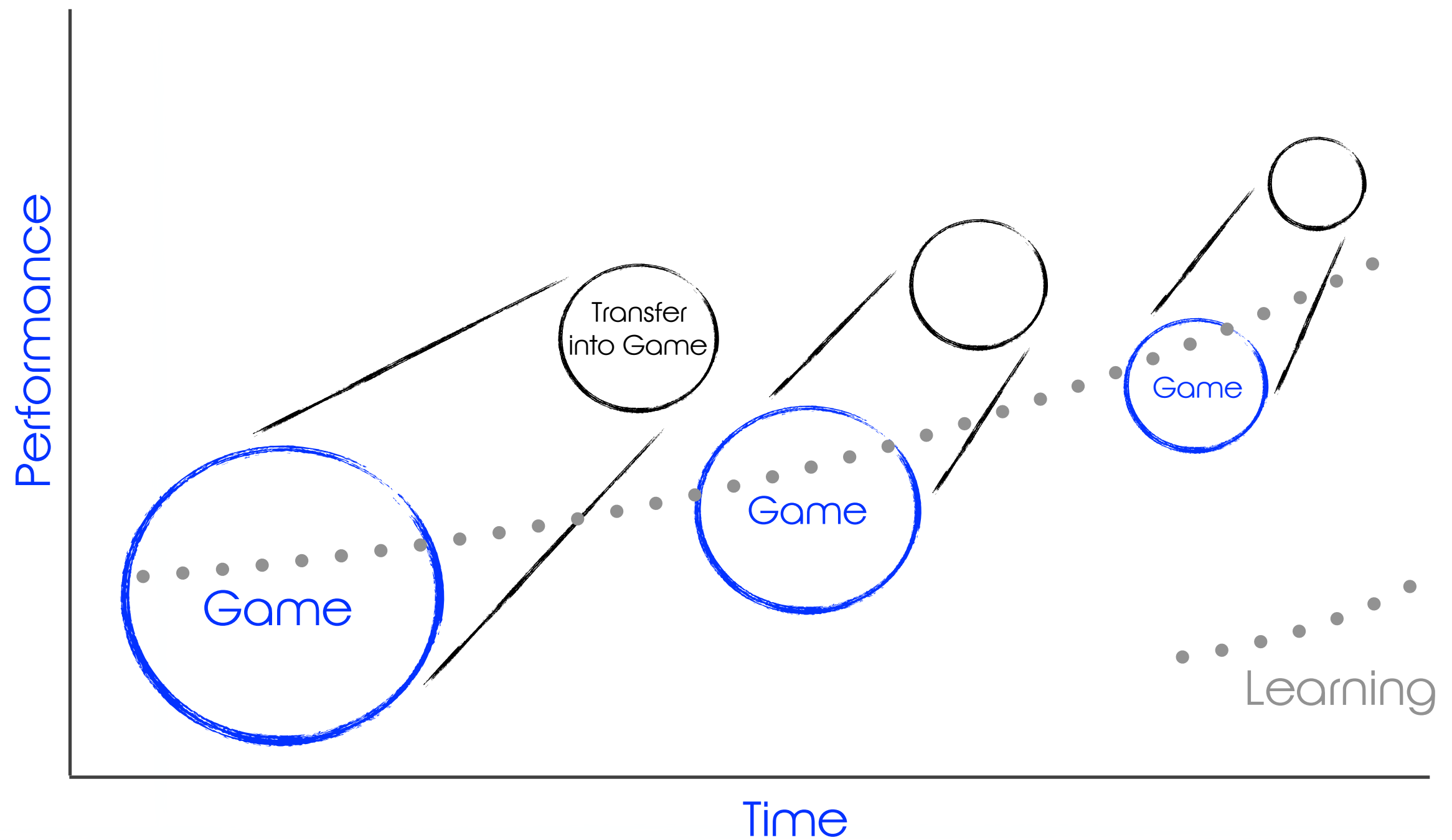
Dauids, Bennett & Button (2008)



Game & Skill Zone Considerations

- **Purpose**
 - Game 'Needs' Based (**Learning Outcomes**)
 - Pre-Planned or Emerges in Game
 - Identify Problem (Technical Actions & Tactical Actions)
- **Manipulations**
 - Pre-Planned (**Give Solution**) or Emerges in Practice Game (**Find Solution**)
 - Represent & Exaggerate it
- Game Form: Small–Large Sided, Directional etc
- Rules & Regulations
- Equipment – Space & Boundaries (shape, width–depth) – Numbers (less–more)
- **Decision Making** (Divergent~Convergent) (Game or Drill)
 - Start Position (static–dynamic, certainty–uncertainty)
 - Ball Start Position (initial conditions)
 - Gaps (between player)

Practice Structure



Task

Goal/Purpose
Rules and Regulations
Space and Boundaries

Equipment

Information



Task

Goal/Purpose
Rules and Regulations
Space and Boundaries
Equipment
Information

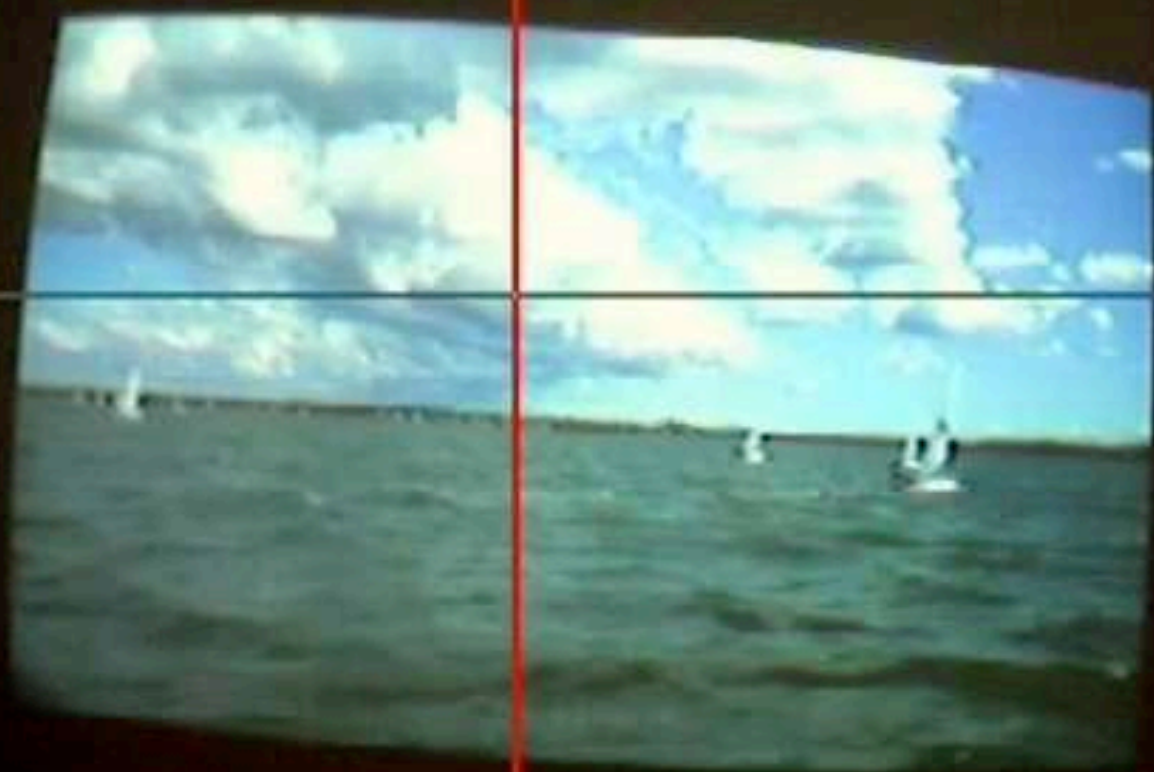




Olympic Sailing

information action systems

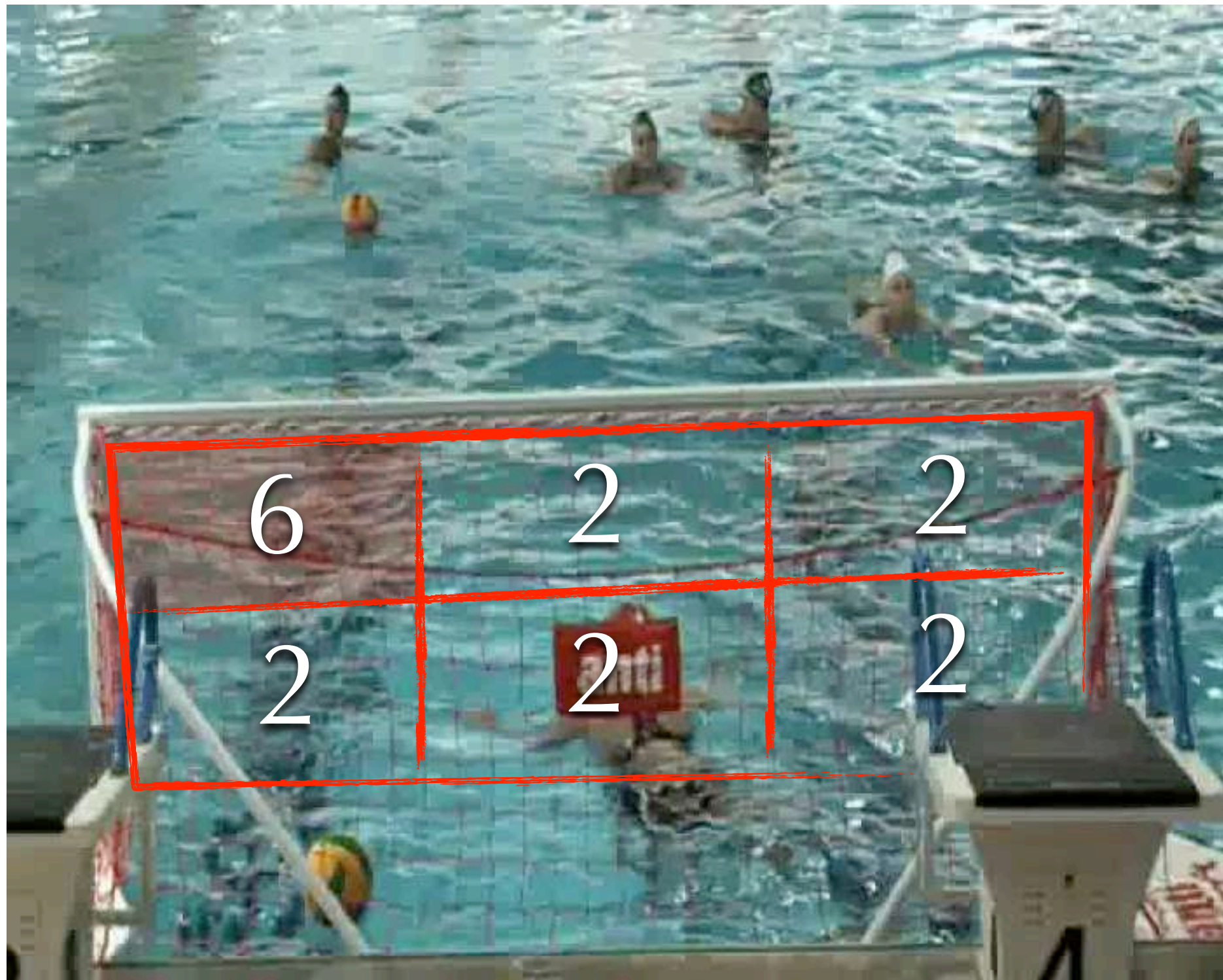
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 Weather patterns

Olympic Waterpolo

information action systems



Olympic Sailing

information action systems

- ⚡ Coordination Dynamics
- ⚡ Amplifying the Problem
- ⚡ Co-Vary COM  with Boat Roll 
- ⚡ Additional Degrees of Freedom
Pitch, Yaw, Sail Trim, Tiller, Rudder
- ⚡ Learn to Unfreeze additional DoF
while Co-Varying COM and Roll
- ⚡ Fun and Enjoyment

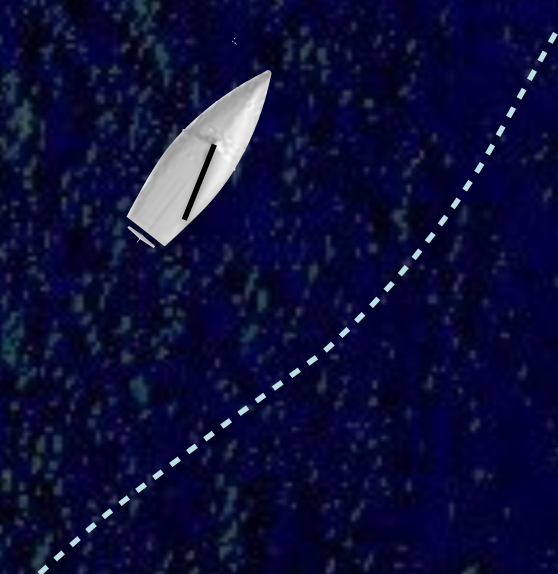
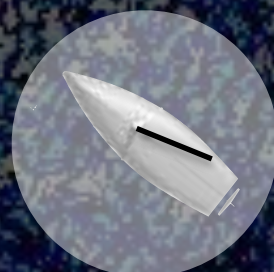
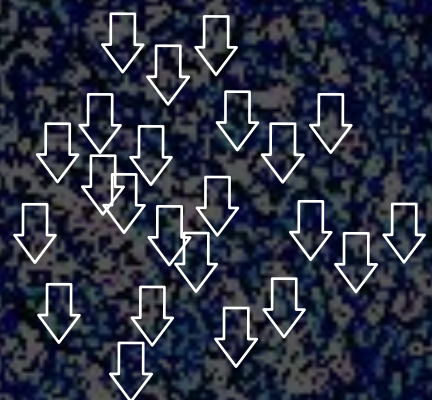


Olympic Sailing

information action systems



wind



AIK Sweden

information action systems



[4v3]
Purpose
Start Position
Pattern
Endpoint



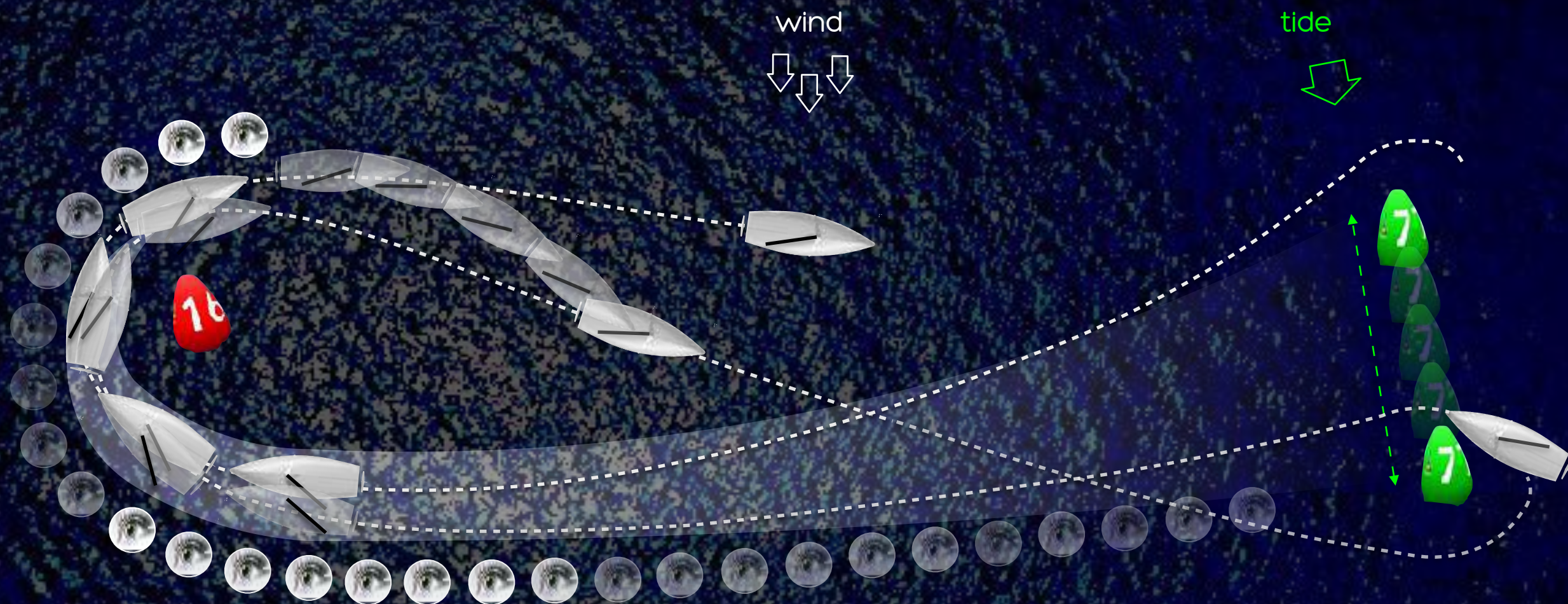
Olympic Sailing

information action systems






Olympic Sailing

information action systems



Coordination Dynamics

-  Information-action coupling of starboard marker displacement and portside approach angle-speed variation
-  Variation in strength of information-action coupling for regulating action
-  Potential performance rate limiter being relatively large or abrupt alignment variation

Olympic Sailing

information action systems



Olympic Waterpolo

information action systems

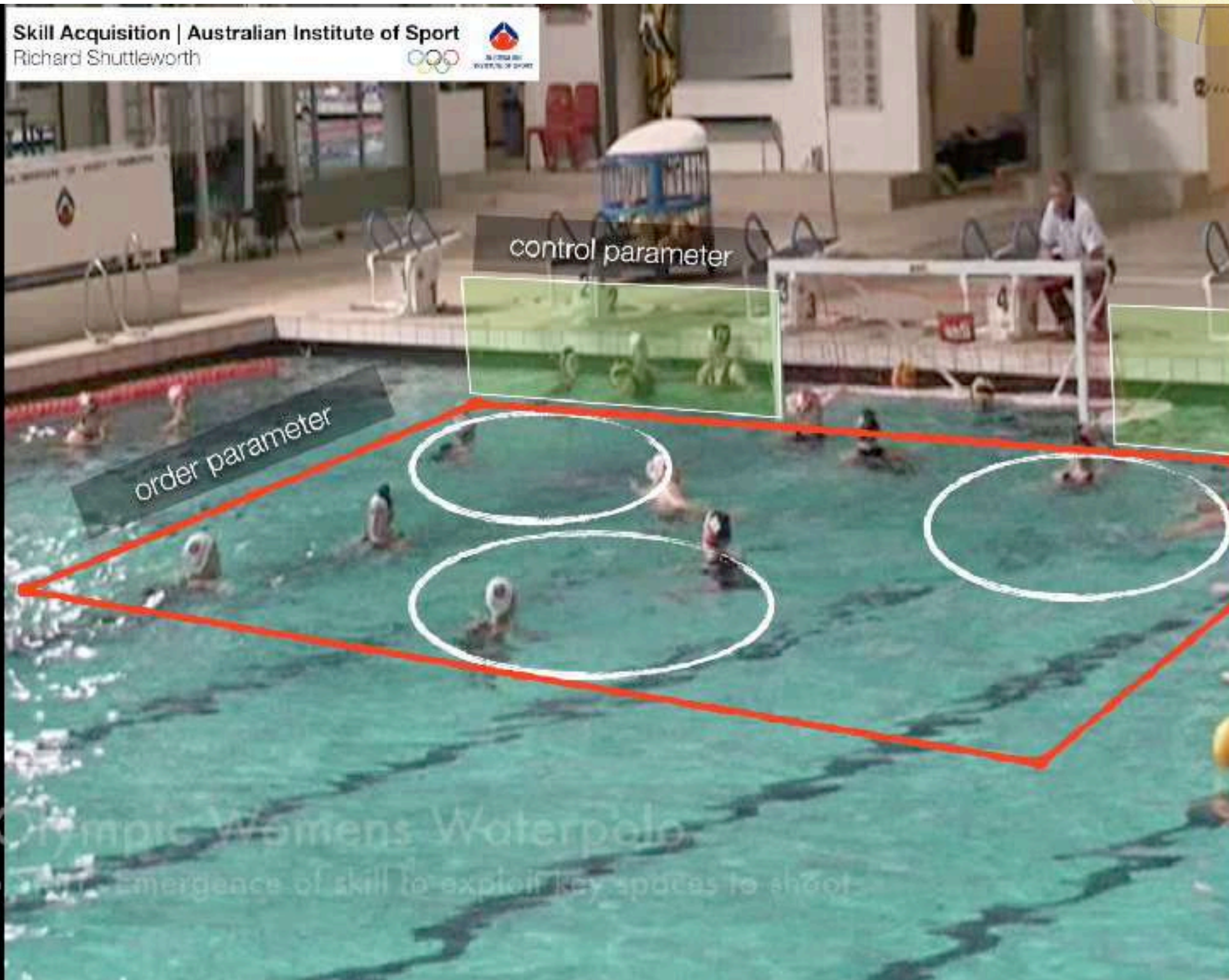


Olympic Waterpolo

information action systems



Skill Acquisition | Australian Institute of Sport
Richard Shuttleworth



AUS Olympic Womens Waterpolo

Messy to start. Emergence of skill to exploit key spaces to shoot.

Olympic Waterpolo

information action systems

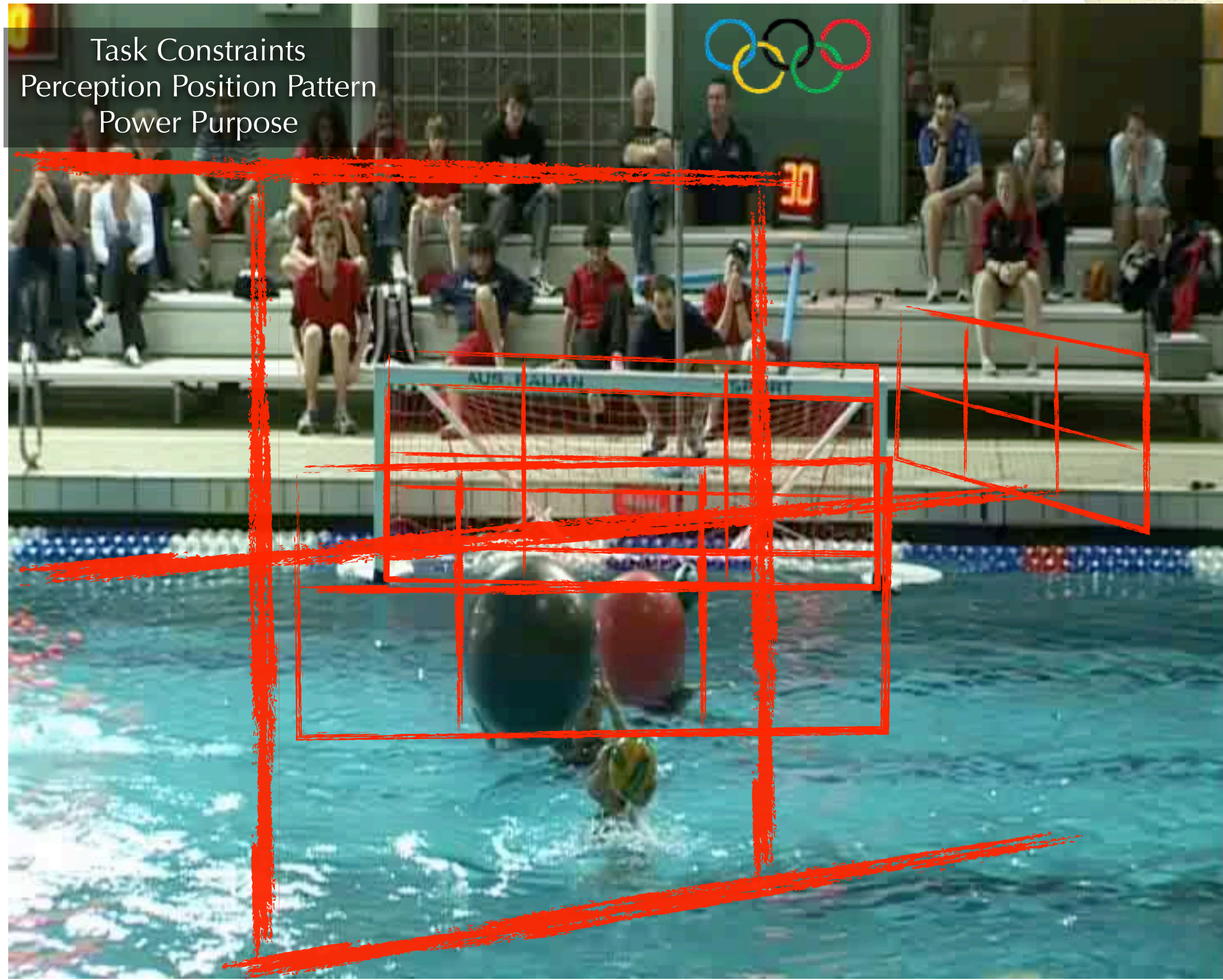


Olympic Waterpolo

information action systems



Task Constraints
Perception Position Pattern
Power Purpose



Olympic Waterpolo

information action systems



Dynamic Perturbation
Position Pattern
using Hoops



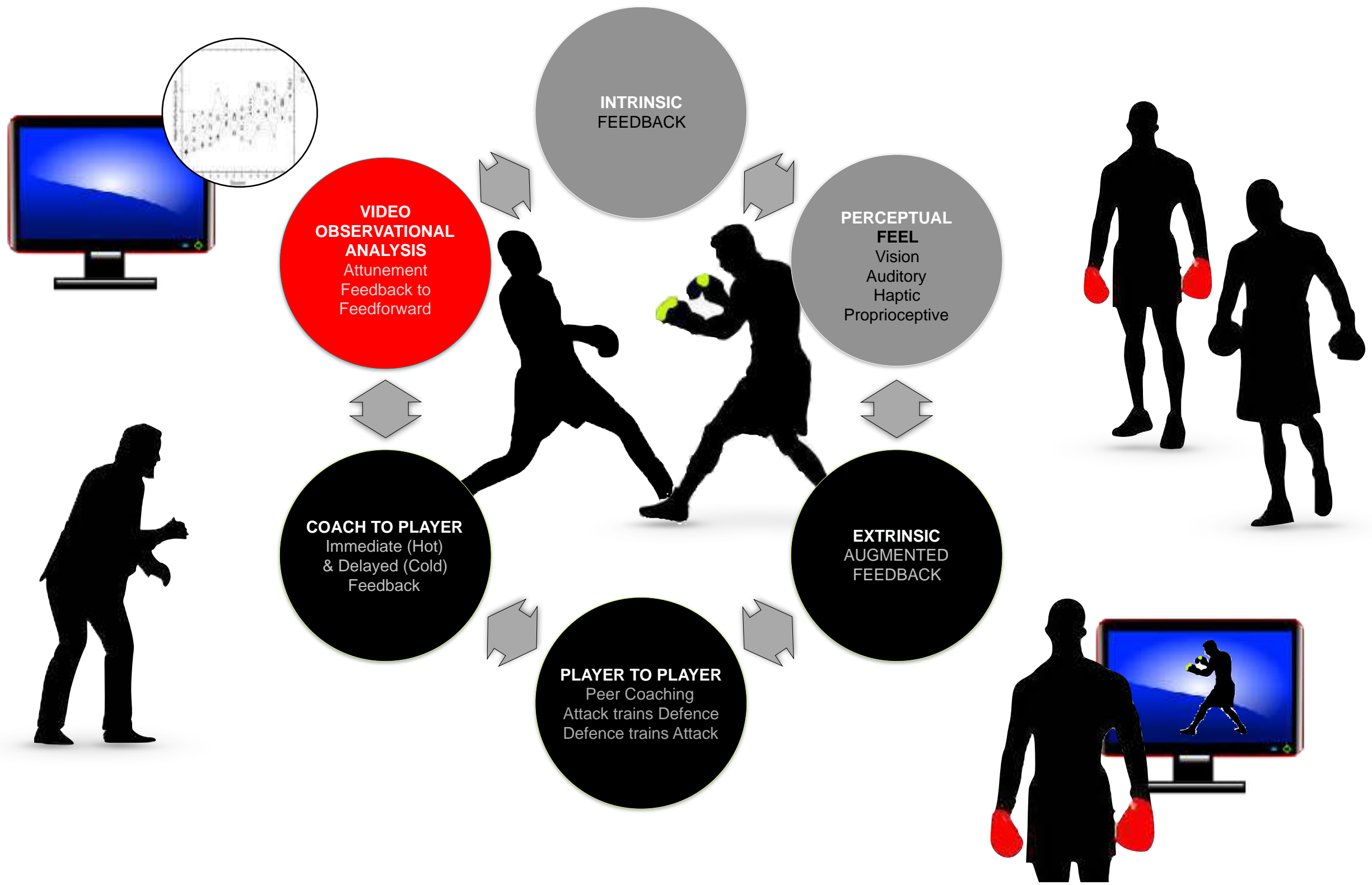
Olympic Waterpolo

information action systems



Feedback Loop

Information Regulates Action



EFFECT FOCUSSED

Skilled Players Learn by 'Doing' - to be "Effective"

