Nonlinear Pedagogy – considering the 'constraints'

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NONLINEAR PEDAGOGY – Draw a line to connect each term to its correct definition:

Constraints		- possible movement solutions offered by parts of the body
Rate Limiters		- represents a broad framework for the study of human motivation and personality (autonomy, competence & relatedness)
Affordances		- the spontaneous formation of functional patterns
Degrees of Freedom		- has a theoretical grounding in Ecological Dynamics and provides a suitable framework to understand how functional movement behaviours can be taught to learners
Self Organisation		- are boundaries that shape behaviours
Nonlinear Pedagogy		- action-relevant information is both generated by and reciprocally used to regulate movement meaning ‘we must perceive in order to move, but we must also move in order to perceive’
Self Determination Theory		- are factors that influence how you learn and may potentially restrict your performance
Perception-Action Coupling		- opportunities for action or what an object, surface or other individual offers an athlete in terms of opportunities for action

There is evidence to suggest that the ancient Greeks & Egyptians twirled hoops around their belly to have fun and maintain their fitness.

(Biswas, 2019)

In fact, ‘hooping’ burns as many kilojoules as you burn by doing kickboxing or aerobics ….

(Biswas, 2019)

“Kooza” Cirque de Soleil – Singapore (2017)

Find a friend – and start 'hooping' …

Coordination modes in the multisegmental dynamics of hula hooping

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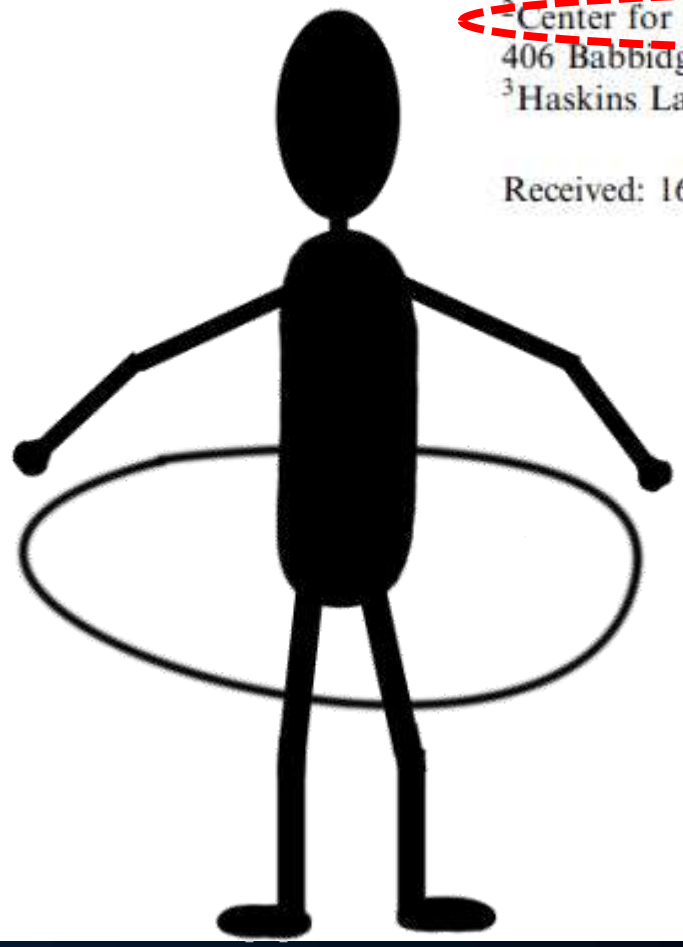
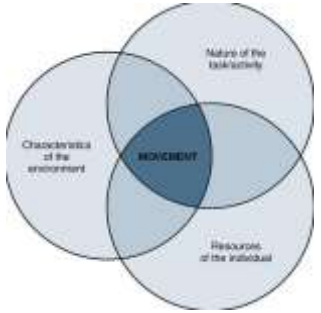


Abstract. In hu d motions of the body keep the h motion parallel to the ground. hesis that the multiple degree er limbs in producing the c control

bert relative phase suggested a lower-limb organization into a vertical suspension mode and an oscillatory fore-aft mode. These modes might stabilize the hoop's angular momentum by controlling, respectively, its vertical and horizontal components.

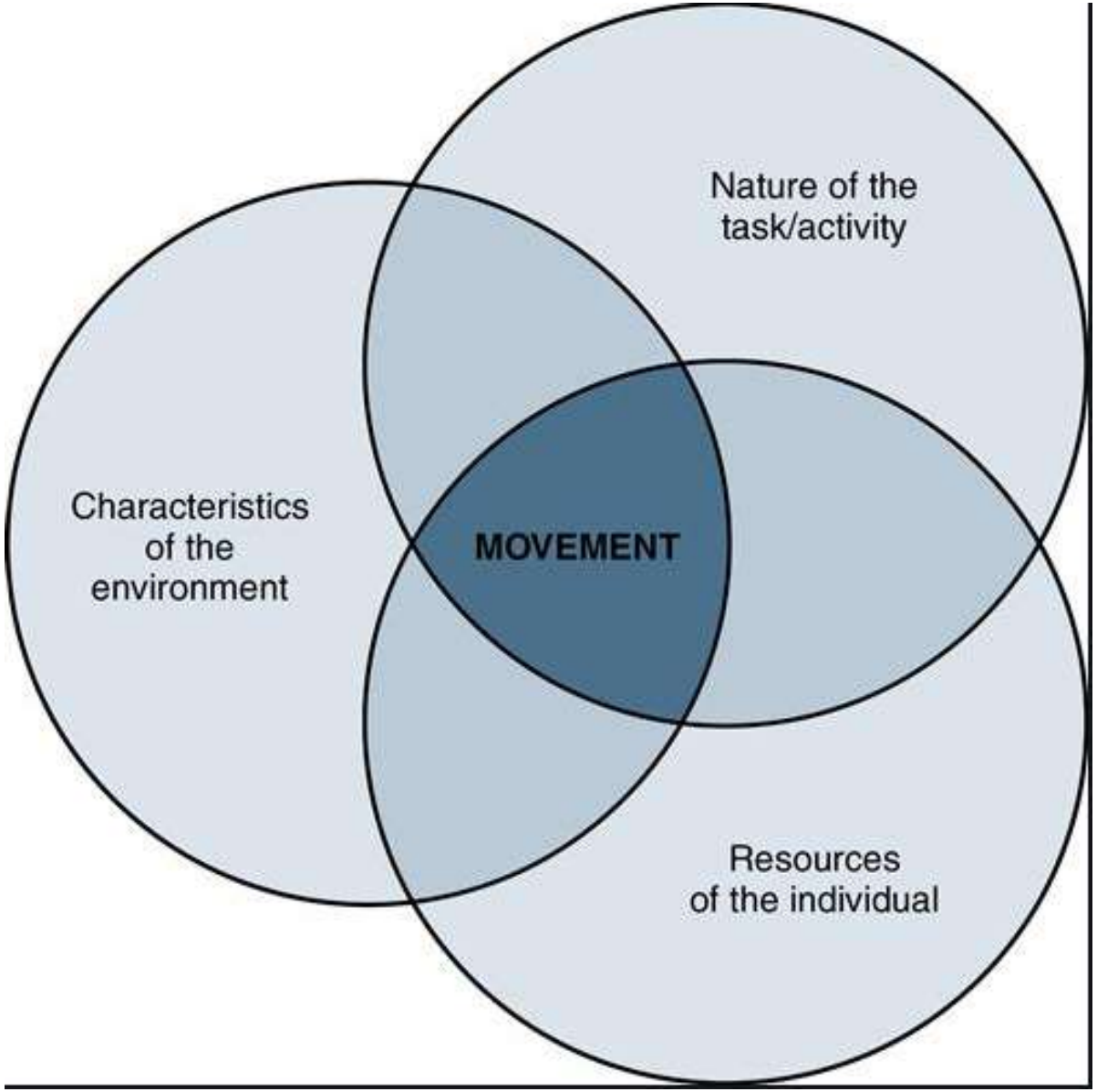
SO … how did we get here?



	Behaviourism	Cognitive Systems Approach	Dynamic (ecological) Systems Approach
Developed from	**Behavioural Psychology**	**Cognitive Psychology**	**Ecological Psychology**
When?	Pavlov (1897) Watson (1913) B. F. Skinner (1930)	Plato (428 BC—348 BC), Descartes (1596-1650).	Bernstein (1967) action Gibson (1979) perception
Theory (model) to explain learning of motor skills	**Stimulus - Response** ("programmed animals" respond to a stimulus)	**Information Processing Model (Cognitive Model)**	**Ecological Dynamics** (Motor Learning Theory) • Ecological psychology • Dynamical systems theory
Learning (movement) occurs as a result of:	• instruction and reinforcement/ punishment produces a response or behaviour (conditioning) • no thinking	• brain processes information (like a computer), selects a response and programs movement • thinks then acts	• Movement emerges from the interaction between the individual, the task and the environment
Movement is controlled by	**External Environment (training)** • brain not recognised	**Brain** • environment and subconscious control mechanisms of body not recognised	**Entire Body** (brain, subconscious control mechanisms of the body, i.e. nervous system, musculo- skeletal system) **and the Environment**

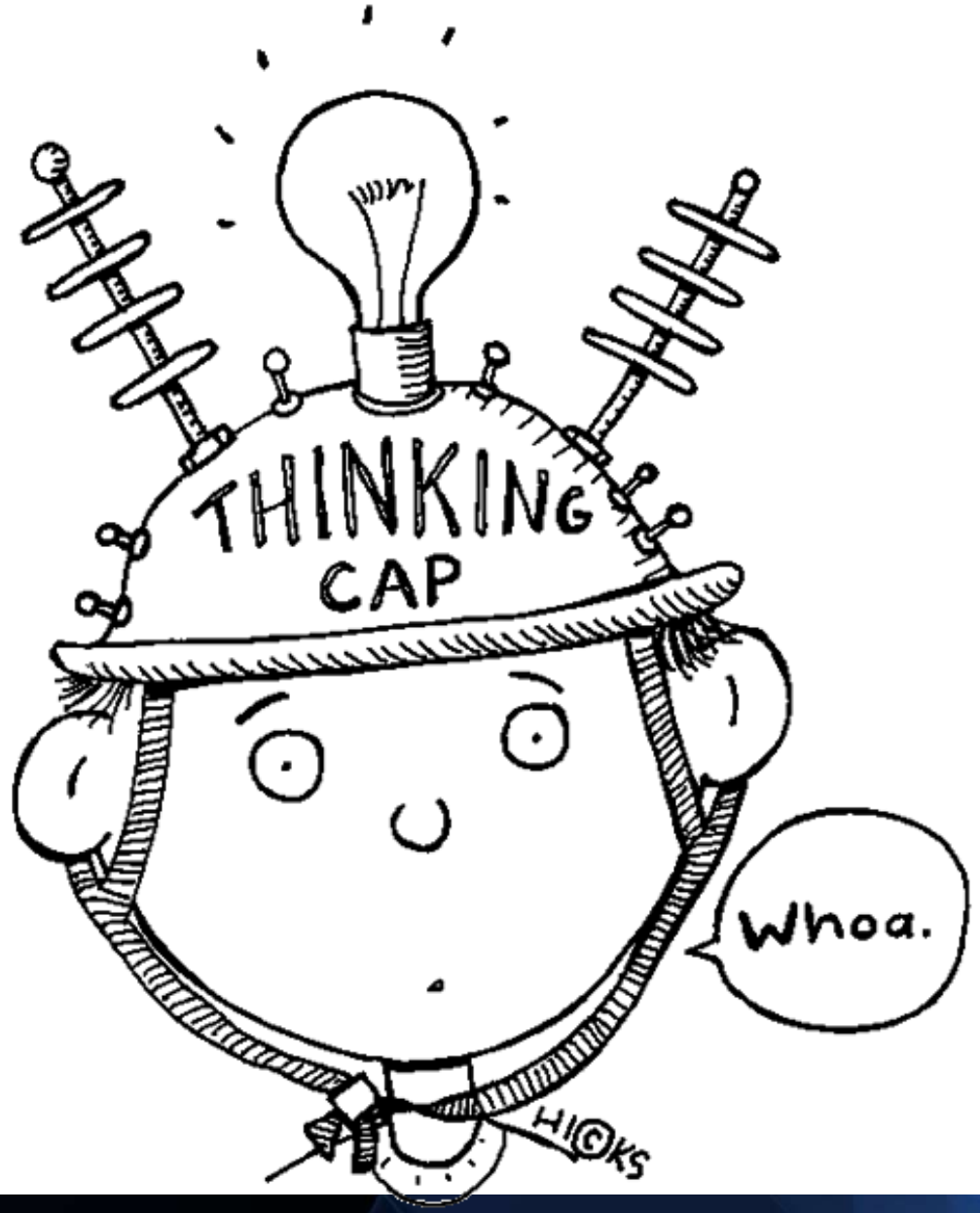
Moy (2018)

SO …
WHAT DOES ECOLOGICAL DYNAMICS (i.e., motor learning theory) MEAN FOR ‘HOOPING’?

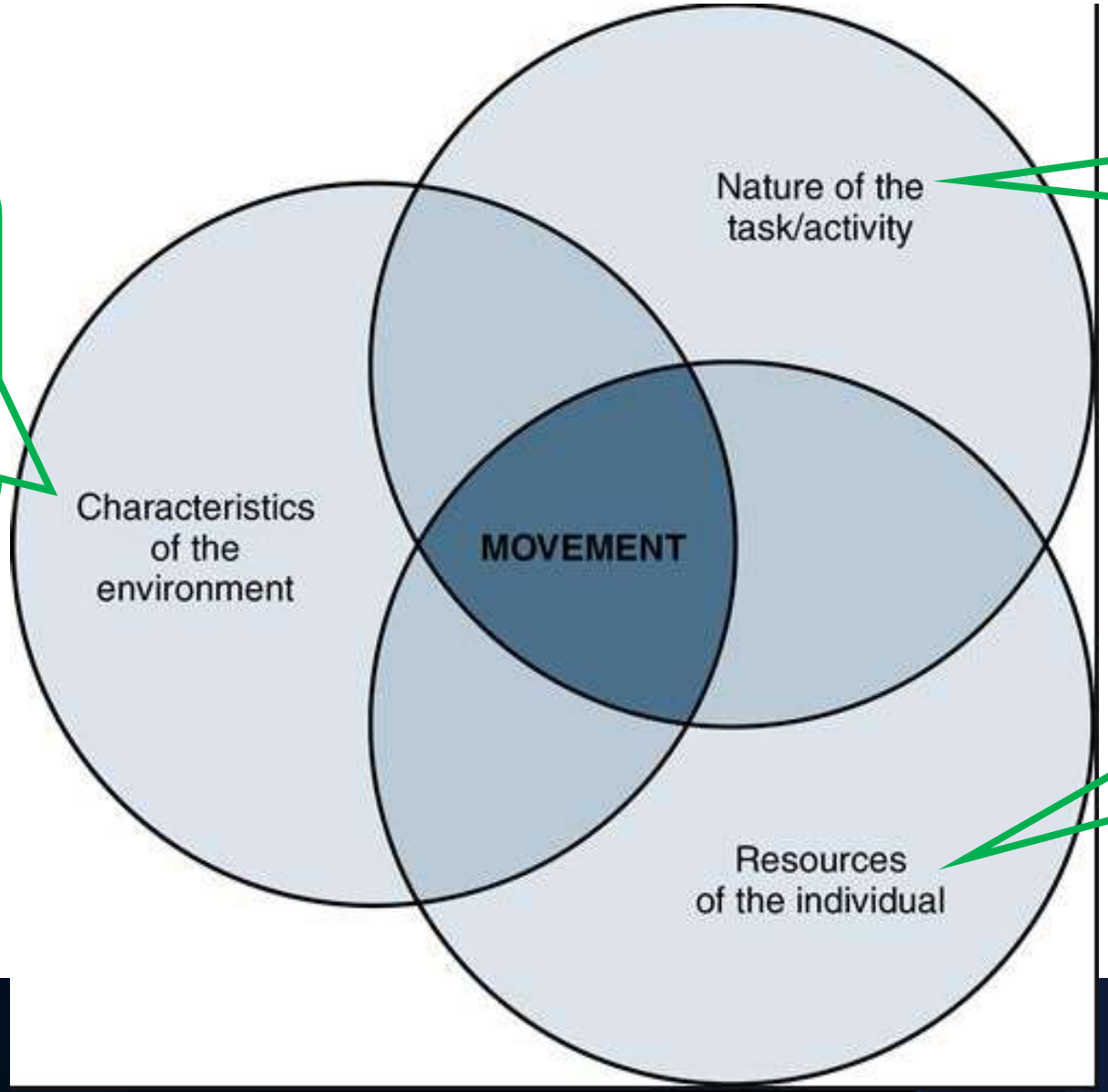


Consider

what synergies (i.e., coordinative structures) make up the collective variables involved in performing the task of hooping …



Labelling **the synergies…**



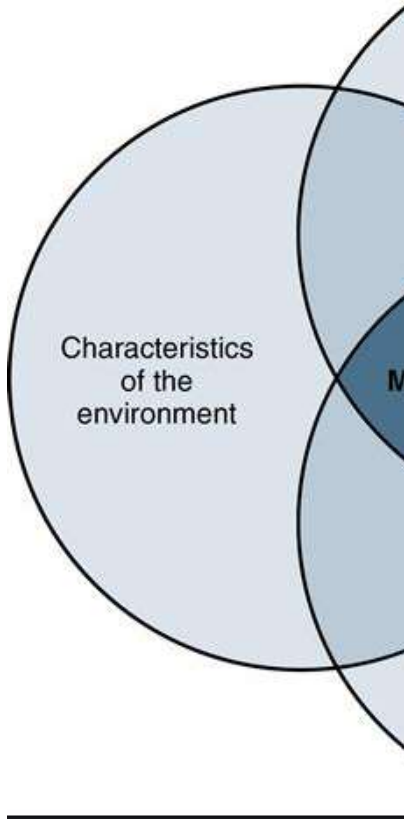
WHAT were the research results…

Dynamically viewed, multi-articular actions represent short living compositions of movement system degrees of freedom, which are ‘soft’ assembled (i.e., temporarily formed) and annihilated to continuously satisfy task and environmental constraints.

…and hip
…e same
…e hoop
…al conditions”

Balasubramaniam & Turvey (2004)
Coordination modes in the multisegmental dynamics of hula hooping

Linking 'dy



CONSTRAINT-LED SESSION PLANNING

G GOAL	R REALITY	O OPTIONS	W WAY FORWARD
• What's the goal or intention for this session? • How does this link to the overall goal? • The focus for learning is . . .?	• What's the current skill level? ○ Co-ordination? ○ Adaptability? • What affordances of the performance environment do you want to design-in to practice? ○ Which? ○ Why? ○ When?	• What practice activities will bridge the gap? • Which practice environment will you use? • What constraints will you use and how will you manipulate them? • How will you measure performance? • We will know we have been successful if: ○ We can see . . . ○ The data shows . . . ○ The coach says . . . ○ The performer feels . . .	• How will you prepare the practice environment? • How will you prepare the performers for the session? • Is there anything else you need to do to be ready?

Figure 6.1 Adapted GROW model for constraints-led session planning.

) SESSION PLANNING

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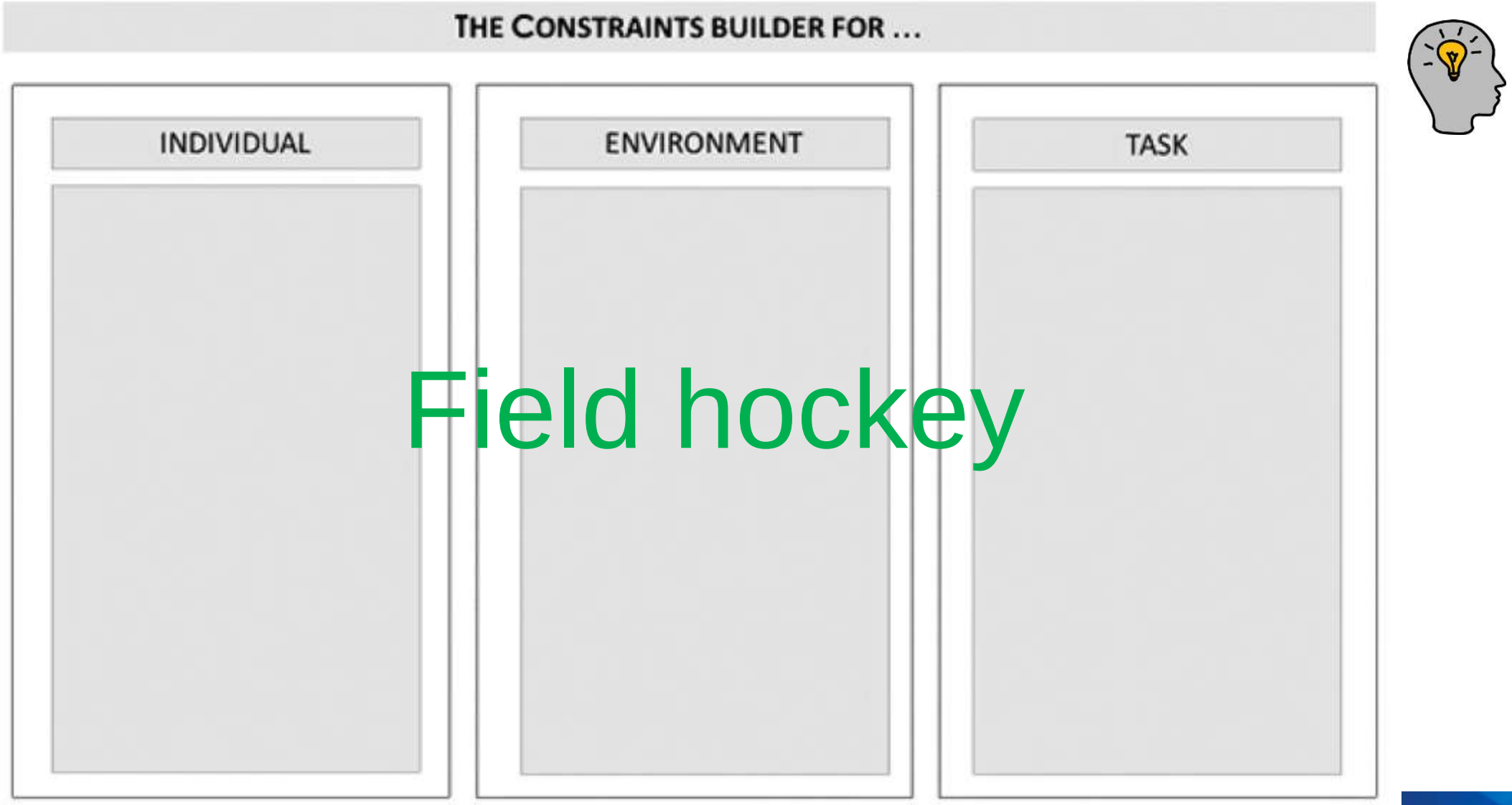
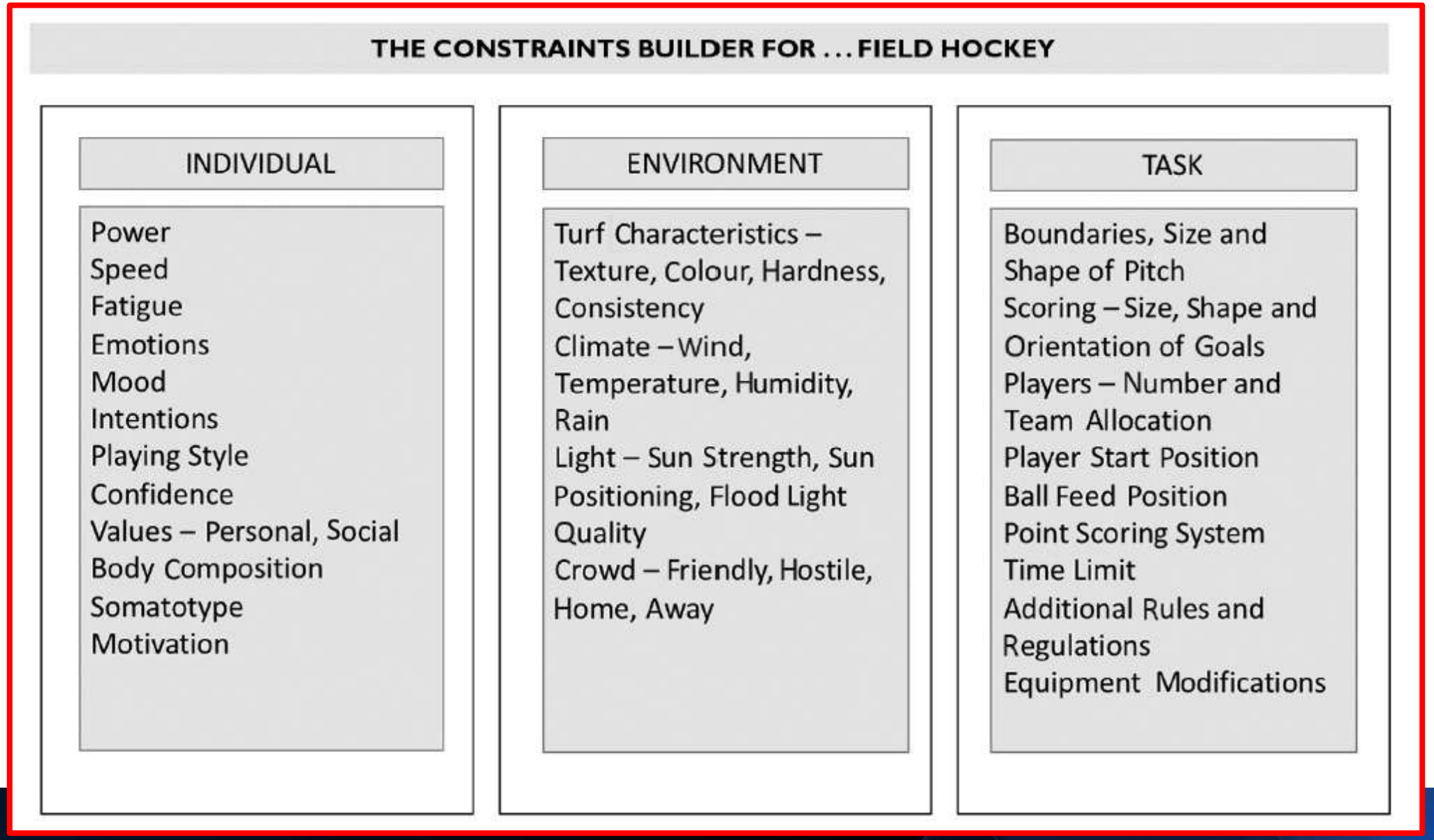
onstraints-led session planning.

Activity – work in pairs to design constraints for …



Solutions ...


THE CONSTRAINTS BUILDER FOR . . . FIELD HOCKEY
INDIVIDUAL
Power
Speed
Fatigue
Emotions
Mood
Intentions
Playing Style
Confidence
Values – Personal, Social
Body Composition
Somatotype
Motivation
ENVIRONMENT
Turf Characteristics – Texture, Colour, Hardness, Consistency
Climate – Wind, Temperature, Humidity, Rain
Light – Sun Strength, Sun Positioning, Flood Light Quality
Crowd – Friendly, Hostile, Home, Away
TASK
Boundaries, Size and Shape of Pitch
Scoring – Size, Shape and Orientation of Goals
Players – Number and Team Allocation
Player Start Position
Ball Feed Position
Point Scoring System
Time Limit
Additional Rules and Regulations
Equipment Modifications

Thus …

- Once a comprehensive list has been created you can design-in the '*constraints to afford*' that will help meet the session intentions.

- Ideally, the choice of constraint is based on an understanding of its likely impact on performance e.g., field hockey example, *the ability to counter attack will increase the number of goal attempts in open play particularly when playing against higher ranked teams*

Basic **Planning Document …**

PLANNING DOCUMENT			
G	R	O	W
GOAL	REALITY	OPTION	WAY FORWARD
What's the goal/intention for this session?	What's the current skill level?	Which practice environments will you use?	How do you prepare the environment?
How does this link to the overall goal?	What affordances of the performance environment do you want to design-in to practice?	What constraints from the environment will you use and how will you manipulate them?	How do you prepare the student/s?
The focus for learning is …		How will you measure performance?	Anything els
		Where on the environment continuum will you place the session?	

- Individual
- Environment
- Task

Hooping activity …

Big Picture:

By considering how coordinative structures (i.e., synergies) are continuously (re)organised creates opportunities for us as HPE teachers to consider how coordination and control are based on the interactions between specific task, environmental, or personal constraints

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Lee, Chow, Button & Tan (2017)
Nonlinear Pedagogy and its role in encouraging twenty-first century competencies through physical education: a Singapore experience

BUT perhaps more importantly …

We as teachers can educate our students to understand that through the interaction of the three categories of constraints – task, environment and individual – students can reflect on their own performance in order to learn how to self-organise (and reflect) in an attempt to generate effective movement solutions.

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Rate Limiters	- represents a broad framework for the study of human motivation and personality (autonomy, competence & relatedness) **SDT**
Affordances	- the spontaneous formation of functional patterns **Self organisation**
Degrees of Freedom	- has a theoretical grounding in Ecological Dynamics and provides a suitable framework to understand how functional movement behaviours can be taught to learners **Nonlinear pedagogy**
Self Organisation	- are boundaries that shape behaviours **Constraints**
Nonlinear Pedagogy	- action-relevant information is both generated by and reciprocally used to regulate movement meaning 'we must perceive in order to move, but we must also move in order to perceive' **P-A Coupling**
Self Determination Theory	- are factors that influence how you learn and may potentially restrict your performance **Rate limiters**
Perception-Action Coupling	- opportunities for action or what an object, surface or other individual offers an athlete in terms of opportunities for action **Affordances**

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