

STUDY AREA 2 : MOTOR CONTROL**Week 4 :****Topic Four: Dynamic systems approaches to motor control and motor learning****Learning objectives:**

- Describe dynamic systems theories of motor control
- Recognise constraints on movement
- Discuss ecological models of perception
- Outline the constraint-led perspective to skill acquisition
- Recognise practical implications of dynamic systems theories and constraints-led perspectives

DYNAMIC SYSTEMS THEORIES OF MOTOR CONTROL**CONSTRAINTS ON MOVEMENT****Dynamic system : Human motor system**

- > Depending on the interaction of many independent and interacting parts of the organism, the environment and the task being performed
- > Movement not based on central representation (i.e Motor program), but emerge naturally as part of a complex system

Dynamic systems

- > Base on nonlinear dynamics to explain changes in complex systems with many interacting parts that can affect me another
- > e.g. weather systems, traffic flow in a large city, the flow of water down a river, population growth

Dynamic systems : Nonlinear dynamics

- > Proposes that complex systems, (i.e human motor control), do not follow linear progressions but that there are abrupt changes (or transitions) from one stable state to another
- > Occur naturally (i.e. don't require some sort of command centre to organise the changes)
- >> e.g. a cyclone emerges as part of a weather pattern when specific environmental conditions are present
- >> e.g. boiling water

What do dynamic system explore?

How the system changes from one movement pattern to another based on a change in one variable related to movement, such as an increase in speed.

- > e.g. the change from walking to running as the required speed of movement increases

Dynamic systems - severally assumptions**Self organisation**

- When specific constraints are present, system organises into specific stable state of movement
- Dynamic interaction of constraints on movement
- > Oppose motor program views where movement is determined centrally
- > e.g. walking

Constraints

- Boundaries that influence the movement capabilities of individuals
- 'Constraints' = limit movement / learning but can also enable movement or represent resources that the learning can use to perform the movement
- Three categories of constraints
- > Organismic
- >> Characteristics of the individual that influence movement