AFL National Coaching Conference 2010

1B

Damian Farrow
(Australian Institute of Sport)

Skill Acqusition for AFL Football

Australian Government
Australian Sports Commission

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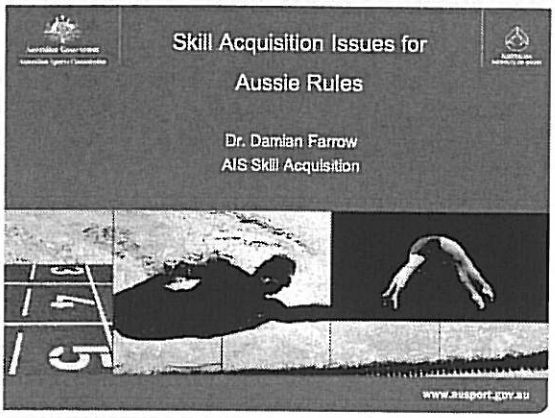
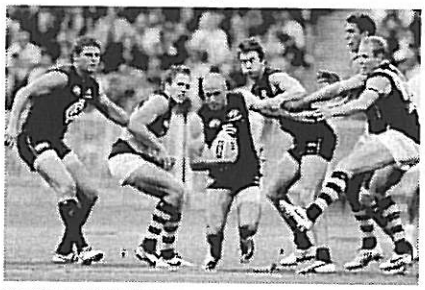
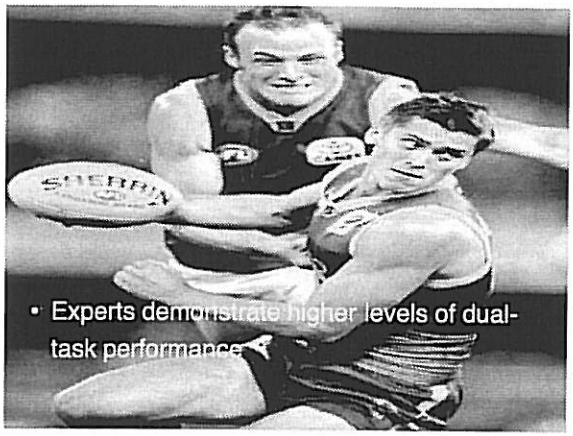
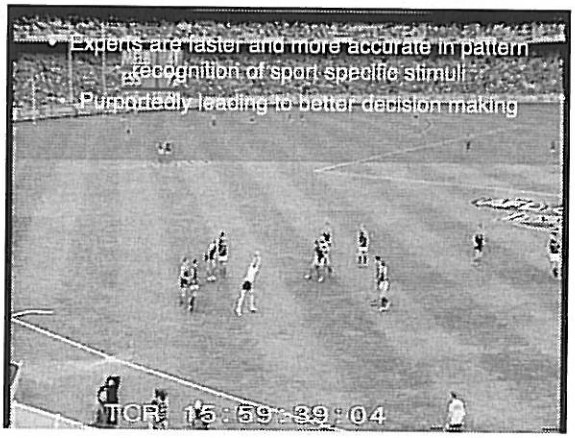


Characteristics of the Highly Skilled







Expert Decision Makers in AFL

- Invested more hours in organised sport & related deliberate play activity than non-experts
- Invested 3x as many hours in invasion activities other than AFL compared to non-experts
- Made a relatively smooth transition to senior AFL ranks relative to non-experts
- Type rather than quantity of practice a key factor
- 8-14 years of age gain lots of related experiences before specialising at approximately 14-16 years of age

Berry & Abernethy 2003

Modelling

EB1 revealed that modelling of other expert players is a strategy that he continued to use even when he himself had become an elite player. "When you watch guys like Brian Lara or Sachin Tendulkar, Ricky Ponting, you just pick up little things. I remember clearly I scored a test hundred ….and I think it was at that stage the third fastest ever hundred by an Australian test batsmen… and I was actually [imagining] I was Brian Lara out in the middle."

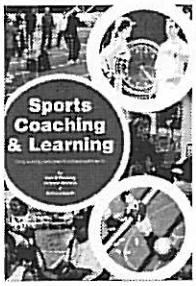
PRE PRACTICE PREPARATION

Learning Style Assessment
Implicit or explicit instructional approach

Coach & Athlete Interactions

Athlete: Modality	Coach: Visual	Coach: Aural	Coach: Read/Write	Coach: Kinesthetic
Visual				
Aural				
Read/Write				
Kinesthetic				

Reference



Sports Coaching and Learning : Using learning preferences to enhance performance
ISBN Number 0-476-01461-1
May 2005
Neil Fleming
Graeme Robson
Richard Smith

Traditional Approach

- Assumes that, to acquire and execute particularly complex skills, a performer must know what they are doing
- Learning occurs by primarily verbal instruction from coaches
- The learner constantly tests hypotheses in order to establish the best way to move to achieve the desired outcome

= Explicit learning

The Downside of Explicit Instruction

- Over time performance becomes expert and automatic, but is associated with a highly *verbal* mode of control
- Bliss-Boder hypothesis: when attention is given to a well learned action, it interferes with performance and skill execution can be disrupted (Bliss, 1895; Boder,1935)
- = yips, paralysis by analysis, choking, or reinvestment

Implicit Learning: It's Like Riding a Bike

- Acquisition of a skill without the development of verbalizable knowledge about how to perform the skill
- Evidence supports usage for development of :
  - Core skills
  - Anticipation in reactive / time stressed situations
  - Not for complex tactical information

Benefits of Implicit Learning

Implicit Learning >>

- Resilient to psychological stress
- Non-attentionally demanding
- Robust to physiological stress
- Durable over time
- Independent of age and IQ

SKILL ACQUISITION FRAMEWORK

Constraints Approach: A Hands Off Model of Coaching

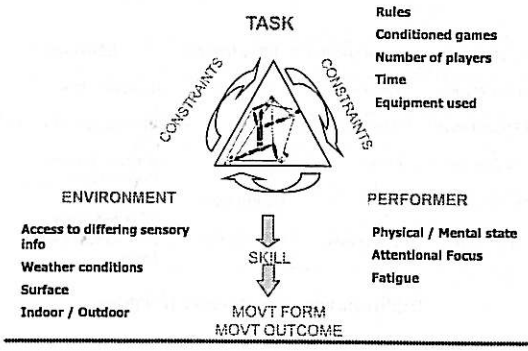
Constraints Coaching Philosophy

Coaches should discard the strategy of verbally instructing learners to produce an idealized technique in favour of understanding how players can best discover a specific movement solution that harnesses their unique intrinsic dynamics

Verbal Communication as a Temporary Informational Constraint

- Learners couple movements (NOT WORDS) to environmental information sources.
  - Verbal instruction can be used as a shortcut to discover a suitable movement pattern.
- Directs learners attentional focus to facilitate self-organisation
- Temporary!
  - Easy to create a dependency
  - Usually not available in the performance context
  - Learners forget 4 out of every 10 comments you make

Constraints Coaching



Constraints Coaching

- Coaches Role
  - Determine how to create practice that allows players to learn by themselves
  - Guide and Shape rather than Dictate
- More difficult style of coaching due to need to:
  - Understand game well
  - Use a questioning style of instruction
  - "More hands off" – skilful observation

Promote Long Kicking using Constraints

- Coach Instruction:
  - "Aim is for a forward to take possession in attacking 50m"
- Task:
  - Long narrow playing area
  - Only have 20 seconds to get from FB to attacking 50m
  - Even numbers in each 50m zone except 3 on 2 in midfield
- Performer:
  - Position drill later in session when players are semi-fatigued – less likely to run the ball

UNDERLYING PRACTICE APPROACHES

Individual Skill Development
Team Skills

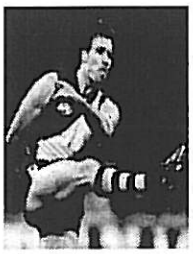
What are you Practicing For?

Learning	Performance
• A **permanent** improvement in skill that is achieved as a function of practice • Suggests underlying mechanisms have been developed	• Skill execution at a particular moment in time **(not permanent)** • Highly variable & sensitive to conditions that have no bearing on the assessment of skill (eg; environmental conditions, level of arousal)

Training Should Reflect Your Practice Aim

Learning	Performance
• Encourage trial & error (doesn't look pretty) • High degree of movement variability	• Encourage consistency • Stable practice conditions (as seen in familiar drills)

Individual Skill Development



Practice Volume

ACTIVITY	PERFORMER	REPETITIONS	ESTIMATE
Cigar Making	Young women	3 mill cigars	Crossman 1959
Football Pass	Quarterback	1.4 mill	15yr x 200d x 4hr x 2/min
Football Punt	Player	.8 mill kicks	200/day x 5 days x 45wks x 15 yrs
Baseball Throw	Pitcher	1.6mill throws	3/min x 80mins x 300days x 10 yrs
Netball Shot	Goal Shooter	598,000 shots	200d x 5 days x 46 wks x 13 yrs

Deliberate Practice: 10 years / 10,000 hrs

Safe Volume?

Investment: The Elite are Better at Practicing

Set practice challenges that exceed current performance level

Push beyond current skill levels

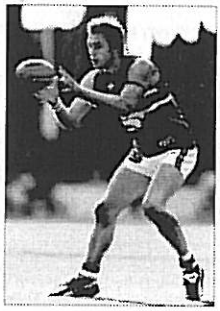
Not just deliberate *physical* practice but *cognitive* also

A Cross to bear

Michael Gleeson The Age 18 September 2008

"He can't walk past a pylon without tackling it"

"He doesn't walk anywhere & runs to the rooms practising picking up pretend ground balls"



"his fiancee hides footies in the cupboards around the house so if he opens a door they would fall out & it would sharpen his reflexes catching them"

Skill Cards

A framework for skill development:

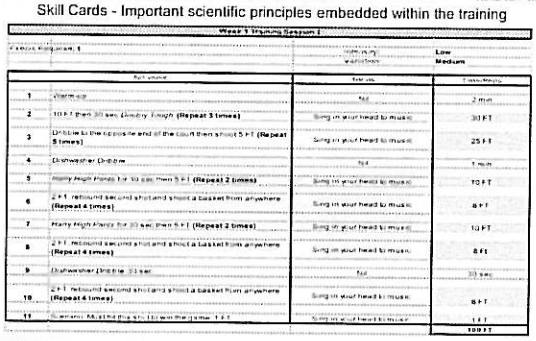
- Deliberate practice (volume)
- Contextual Interference
- Progressive Overload
- Specificity / Variability
- Complexity

Training Matrix

Variation	Intensity: Low	Intensity: Med	Intensity: High
Low	Green 1	Green 3	Yellow 3
Med	Green 2	Yellow 2	Red 2
High	Yellow 1	Red 1	Red 3

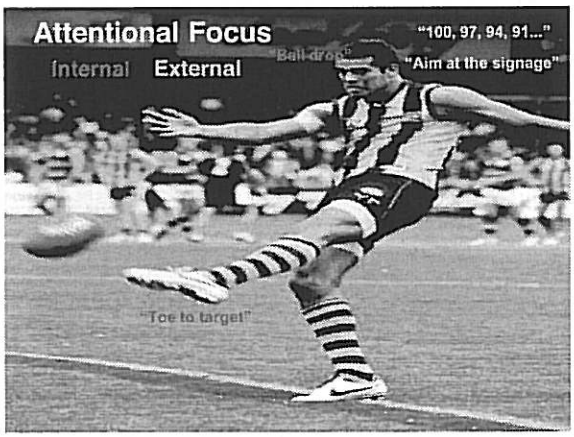
Skill Cards

Skill Cards - Important scientific principles embedded within the training



Advantages of Skill Cards

- The amount of time and energy available for additional training as a team is limited
- Core skill development
- Improve hand-eye coordination and "touch"
- Automaticity
- Individualised to needs of specific players
- Coach doesn't need to be present
- Low-impact (Injured athletes)
- Mental Skills
- Conditioning
- Cognitive Tasks



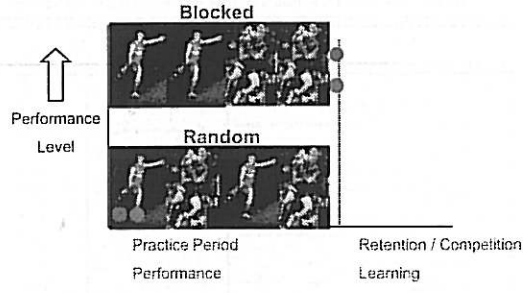
Wilkinson on Doris and Jigsaws

- "I imagine kicking to a lady in the stands – Doris."
- "Every night you go to sleep you may have something on your mind that you have to deal with. That shakes the box up and when you wake up the next day you're not the finished product anymore. The aim of every practice session, the reason I practice the way I do, is to find those pieces and, by the end of the session, to have packed them back in".

Variability = Learning

- Skill Practice:
  - Advantageous to vary practice conditions to maximize retention and transfer of skill

Repeat the means of solving a problem, rather than repeating the solution



Farrow & Maschette (1997)

It's Not Black & White in Application

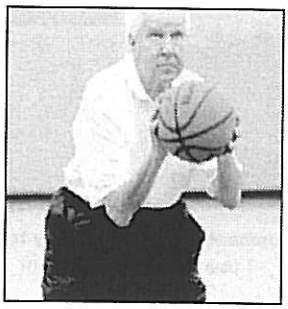
- WHY?
- Performance or learning?
- Skill level of athlete
- Skill complexity
- Confidence

- HOW?
- Win Shift – Lose Stay
- Skill Circuits - Medley
- Feedback Intervention
- Distribution of practice and "rest"
  - Practice – Observe – Practice – Observe
  - Observe – Observe - Practice - Practice

Errorless Learning

- Creating an environment where the learner is always successful. Prevents hypotheses-testing behaviour (because no errors were made)

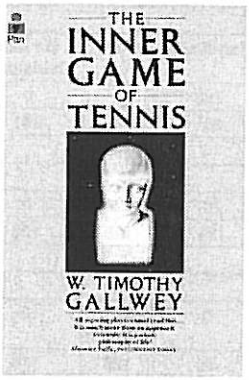
Analogy / Metaphor Learning

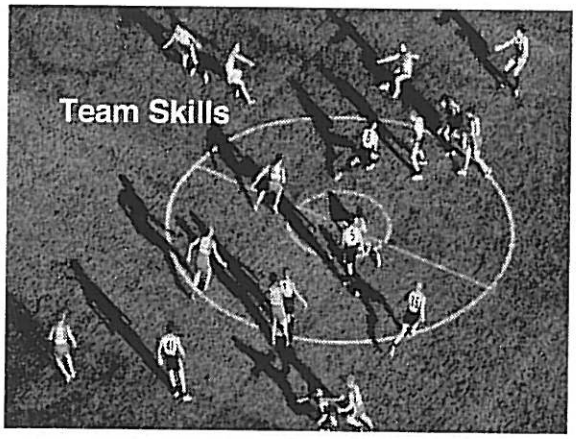


Dual Tasking

No Feedback Learning

- Creating an environment where the learner does not receive any feedback about their performance (specifically remove visual feedback).
- If you don't see what happened how can you test hypotheses?



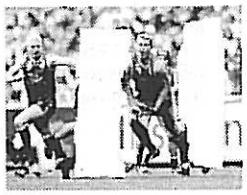


Game-Based Training Approaches

Development of skill (not solely technique) in a game environment

Practice Specificity

- "Transfer of practice to game conditions depends on the extent to which practice resembles the game" (Magill, 1993)
- How does this activity/drill relate to the game?



The Footy Training Conundrum

- Significant time spent developing only one sub-component of team sport performance – isolated skill execution via:
- Simplified drills, often de-contextualised from the game setting
- Why?
  - Component based methodology
  - Easier to control
  - Contamination of physical effects on skill
  - Influence of conditioning staff?
  - Lack of perceived practice quality & volume
  - Player confidence
- "We play games!"

Are Games that Different to Closed Drills?

Farrow, Pyne & Gabbett (2008)

- Aim:
  - Compare physical and skill demands in closed vs open drills
  - Do players get enough touches in open drills?
- Procedure:
  - 30 AIS-AFL squad members
  - Cross-over design
  - Common drill duration / field dimensions

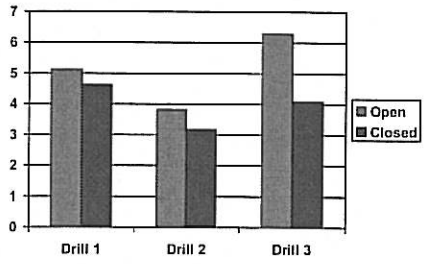
Drill	Closed	Open
1	3 Man Weave	3 vs 2 H/ball
2	4 Point Square Kicking	4 vs 2 Square Kicking
3	Diamond Short Kicking	5 vs 5 vs 5

Measures

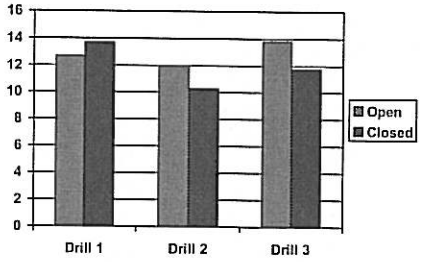
- Movement & Physiological Load
  - Heart rate
  - Lactate (post session)
  - RPE
  - Distance travelled, velocity, movement type (sprint, jog, walk), number of changes in direction (via GPS measurement)
- Skill Demand
  - Number of possessions
  - Number of decisions
  - Cognitive RPE
  - Quality of disposal execution

DRILL 1	Handballs	Kicks	On Ball Decisions	Efficiency
Closed	728		0	
Open	331		241	
DRILL 2				
Closed	207	210	0	94.80%
Open	34	196	120	95.00%
DRILL 3				
Closed	0	491 (119)	0	95.50%
Open	48	126	126	72.00%

Mental RPE



Physical RPE



Key Findings

- Movement & Physiological Load
  - Open drills more demanding in terms of distance covered (m) and the relative intensity (meterage)
  - Number of accelerations were similar
  - Physiological demands were broadly similar
    - Most game like drill elicited a substantially higher heart rate than others
    - The post-session lactate concentration similar
- Skill Demand
  - Kick execution volume similar
  - Decision making volume substantially higher in open format
  - Cognitive load higher in open format (RPE)

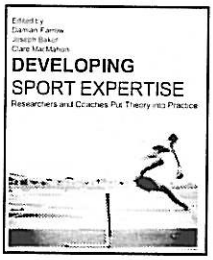
Decision Making Training Principles

- Apply principles of strength & conditioning:
  - Volume
  - Frequency
  - Intensity
  - Overload
- Use a combination of On and Off field activities
- On-field practice:
  - Structured – set plays (controlled with minimal DM)
  - Unstructured – game-based training (messy - valuable)
- Off-field
  - Knowledge development
  - Interactive vision training

Key Decision Making Constraints

- Player density
- Time available to dispose of ball
- Similarity of situation to other situations encountered
- Number of choices available
- Structured or unstructured play
- Change of attentional focus – (narrow – broad)
- Speed of play:
  - Running with the ball at speed
  - Looming defenders
  - Slow play situations from a mark or free kick.
  - Moving while carrying ball

References



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