A Constraint-Led Approach to Coaching Cricket

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Traditional approaches to skill development in cricket have been based around the ubiquitous net session and in particular an emphasis on the acquisition of the perfect technique. More recently, some coaches have taken ideas from sports science and attempted to use them to guide their practice. Some of these mono-disciplinary strategies have resulted in a reduction of 'performance' into separate building blocks (e.g. technical, tactical, physical and mental skills), which can be worked on in isolation before the whole (performance) is stitched back together again. Each of these units is then broken down again. For example, batting is broken down into sub-phases to develop 'hitting mechanics' via use of drop feeds, throw-downs and by use of bowling machines, while, for bowlers the run-up and bowling action are practiced separately. A major problem of this approach is the strong focus on technique development at the expense and in isolation from perception and decision-making skills. Although, for many coaches this intuitively makes sense because it simplifies learning into manageable bites, some experienced high level coaches have been highly critical of this specific contribution of sport scientists and suggested that cricket needed a serious debate to determine whether these new methods are in fact more efficient and better than the methods of the past (e.g., Chappell, 2004). In 2004 we responded to these comments and were in general agreement with the sentiments of Chappell. We pointed out that perhaps the main problem with the approach of the scientists was the relative usefulness of the theoretical model they were basing their work upon and that recent research was highlighting the importance of a holistic, multi-disciplinary approach to skill development (Renshaw et al., 2004). Since then, our research using cricket bowling and batting has shown us that the development of appropriate technique requires learners to practice tasks where perception and action are maintained via environments representative of the competitive performance (Renshaw & Davids, 2006; Renshaw et al., 2007). This view suggests that performance is a function of the interaction of unique individuals with specific task and environmental constraints. In the rest of this article we describe the constraint-led approach and suggest that it is a suitable theoretical model that coaches and scientists can utilise to underpin learning design.

Constraints are boundaries that shape a learner's self-organising movement patterns, cognitions and decision-making processes (Renshaw et al., 2010). Three categories of constraints have been proposed. 1. Performer constraints include physical and mental factors such as height, limb length, fitness levels, technical skills, attentional control and intrinsic motivation. All of these factors can influence decision-making behaviours. 2. Environmental constraints include: physical environmental constraints such as weather conditions, pitch conditions, quality practice facilities and perhaps the structure of the backyard or locality in which a player was raised; and cultural constraints such as family, team mates, the culture of a sport club and access to high-quality coaching. 3. Task constraints include the goal of the task, rules of the game, equipment available and the relative state of the game.

The ideas underpinning the constraint-led perspective have important implications for the coach. Adopting a constraint-led approach requires coaches to understand that performers have the potential to solve performance problems in a number of ways and therefore there is a rejection of the concept of one optimal movement solution. This change of thinking is perhaps one of the greatest challenges for coaches as the traditional approach to developing skill is the concept of demonstrations and feedback. In effect we 'instruct' players how to bat, bowl or field. However, evidence from motor learning is showing that the natural way to learn most movement skills is at a

sub-conscious level and forcing players to 'think' via explicit instructions leads to performance decrements (Beek, 2000). Indeed, Glenn McGrath and Craig McDermott both report singing as they ran into bowl in order to "stop the voices" from interfering with performance.

If instruction is not necessarily helping players to improve, what strategies can be adopted by the coaches? As behaviours emerge as a result of self-organisation under constraints, coaches can deliberately manipulate the surroundings of players to create the conditions that lead to changes in organisation states. For example, the coach could create rule changes in small-sided games that reward taking of singles or encourages bowlers to bowl in specific areas (Renshaw & Holder, 2010). However, manipulating constraints should not just be limited to changing rules. Coaches could change the environment by 'doctoring' specific areas of the pitch by roughing it up or leaving on more grass. These types of manipulations force players to adapt their strategies and can lead to changes in perceptual, decision-making and action skills. Similarly, the development of strength and conditioning and mental skills should not be seen as something that sits separately to skill acquisition as an apparent technical fault may in fact be due to poor strength, concentration or decision making. For example, a common problem for many young batters is that the top-hand is 'weaker' than the bottom hand which leads to difficulties in 'playing the ball straight'. Some coaches have recognised this problem as the key factor limiting performance and have developed strategies to help. For example, Indian batsman Virender Sehwag's first coach made him use just his top hand to swing a bat in a case filled with sand repeatedly in order to strengthen the arm. Secondly, because a consequence of a weak top hand in batting is often the inability to swing the bat in a straight line, in order to make him pick his bat up straight, Sehwag's coach stuck a piece of bamboo in the ground just outside off stump. If the bat was not picked up straight he would hit the bamboo (Renshaw et al., 2010). This practical example neatly demonstrates how a cricket coach can use an understanding of the interaction of individual, environmental and task constraints in order to shape behaviour.

One final point that needs to be made is that the unique interactions between the individual, task and environment constraints means that variability is a key feature in enhancing performance. This is related to both movement variability and variability of practice. Contrary to popular belief expert performers are not able to 'repeat' their movements invariantly, but use functional adaptability in their movement patterns to achieve high levels of accuracy and adaptability to solve problems in constantly changing performance landscapes. Consequently, practice tasks must of course provide high levels of variability.

In summary, adopting a constraints-based perspective to cricket provides coaching with a framework for understanding how performer, task and environmental constraints shape each individual's performance. By adopting an athlete–centred approach which is harmonious with constraint-led coaching, coaches can base learning design on the needs of individuals. Crucially, there is no one ideal movement model that each player needs to be able to achieve and the unique interactions between individual, environmental and task constraints means that each player will solve distinctive performance problems in ways best suited to their own strengths and weaknesses.

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