

Fatal Attraction! The danger of **attractors** and copying things that you don't understand!

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In this article I will discuss the trends (and biases) that I see in coaching (particularly in cricket), the inclusion of more up to date knowledge and theory regarding skill acquisition and the very real dangers of copying things that we don't understand!

WARNING – Long but important read!

Trends and Biases

My thirty year journey as a sports coach has allowed me to witness the many trends and approaches that have become popular in sport in general and cricket specifically over the years. These trends have increased with both the ever increasing opportunities for coaches to earn a living without having to be employed at the highest levels, and by the 'democratisation of knowledge' (more on this later!) through the internet and social media.

The advent of limited overs cricket, then T20, T10, The Hundred and so on, have all significantly impacted upon the way that the game of cricket is played. The impact of this has not only reverberated through grassroots cricket and the way that the game is played there (including the death of 'time' cricket), but also back up the food chain to the way England now play Test Cricket AKA Bazzball!



However, cricket's obsession with an *'ideal technique'* has never seemed to leave us! We still have commentators waxing lyrically about the batting prowess of Kohli for example, asking *"is he the greatest ever?"* (Test batting average 49.29; FC average 50.34). Yet these averages look remarkably similar to Inzamam Ul Haq (Test 49.6; FC 50.10) and behind the likes of Javed Miandad (Test; 52.57; FC 53.37), Shivnarine Chanderpaul (Test 51.37; FC 53.17); Rahul Dravid (Test 52.31; FC 53.33) and Sachin Tendulkar (Test 53.78; FC 57.84). These are all then a little distance behind Wally Hammond (Test 58.45; FC 56.10) and Steve Smith (Test 58.61; FC 55.54), a long way from Graeme Pollock (Test 60.97; FC 54.67) and Sir George Headley (Test 60.83; FC 69.86), and of course, a country-mile from Sir Donald Bradman (Test 99.94; FC 95.14)!



Now before everyone starts screaming at me from a whole bunch of biased perspectives – we are just dealing with objective measures and a bias towards a certain way of playing!

So what does the above comparison show? Well for me it's quite simple, there are many ways to play the game! And that you don't have to look good to be successful! And really radically, maybe, just maybe, the model used in all the coaching manuals is the wrong one? Bradman batted better than anyone else has, so maybe his technique is better than everyone else and the best technique to use?? Now that would be radical! For some reason, there appears to be a bias, by those in the media at least, towards players with a technique that is aesthetically pleasing and not the most successful! (More on this later).

How do we learn to be good at sport?

We are now supposedly in a period of history known as the *'Information Revolution'*; however, information is not the same as knowledge. Opinion and knowledge are not one the same either! Quoting other sources of wisdom (particularly if you can put a nice picture in the background) does not make you wise!

This has never been clearer than now.

It's lovely to see ideas of Teaching Games For Understanding (TGFU) and Game Sense, permeate into cricket coaching circles. Getting coaches to focus on what cricket is – A GAME! And not some strange sequence of movement patterns that can only be executed in a certain fashion if you are to be rewarded with a “*Well done! Great shot!*” by the coach. This is something akin to Kata in Karate, where Karateka perform a series of pre-defined movement patterns and are judged against a model of perfect movement form. Cricket and kata are not the same however and that approach to cricket coaching seems pretty common. It always confused me - when do you get extra bonus runs for having ‘a nice high elbow’? or ‘showing the makers name’? I have however, seen batters being run-out because they ‘held the pose’ too long on a shot!

Yet, the biases towards an ‘*ideal technique*’ remain.



We have now moved, in cricket, from TGFU, to a much more complex set of theories that fit within a Dynamical Systems perspective.

Again, for me and my academic background, this is something I applaud, especially having been ridiculed by several leading coaches when I started publicly presenting these ideas back in around 2003! (It's always interesting to see when critics of your work start to tell you the things that you told them, as if they thought of it first! 😊).

The only problem with Dynamical Systems, Complexity Theory, Chaos Theory and so on is..... They're really complex! Terms like *affordances*, *constraints*, *action-perception coupling*, *degeneracy*, *degrees of freedom* and the like are not straight forward concepts and take some time to get your head around! (and I should know as I have been trying to do this very thing for over thirty years!).

But unless you really understand this approach, it becomes very difficult to use this stuff, let alone use it well.

So, what do you do if you don't understand something? **Google it!**

And for me, this is where a lot of problems lie!

Information, Knowledge, and Wisdom!

The real dangers we have around this ‘*democratisation of information*’ (note I use the term information as opposed to knowledge), is that nowadays, ANYBODY can have a platform to pass on their pearls of wisdom! The more followers this person has, the more influence their opinion carries!

As long as these 'experts' don't contravene the social media platform's rules of etiquette, this *influencer* can carry on 'teaching' the world!



There is this interesting attitude going around, that if you know something a little more than your audience, then you are an expert and you can and should then '*monetise your expertise*'!

What a scary thought that is! But that's what's happening! Not scared by this? Then think of the following:

- You probably knew more about dating at 16 years old than you did at 10! Would your 16 year-old self been an effective and appropriate dating guide for 10, 12, and 14 year olds?

But Harvey – what has this got to do with coaching in general and cricket in particular?

.... I'm getting to that! (But just have a little think about the social media gurus until I do!)

Copy & Paste – part 1.

I have attended many coaching seminars over the years, and one of the approaches often quoted is "*there are no copyrights here; take what you want and copy it so that you have it in your toolbox too!*". And this is what has routinely happened for years. Copying this drill or that, without having the slightest understanding of why it is being used! I have seen similar over the years with football (soccer) and rugby coaches, who know "*this great drill for passing*" or "*we use this grid for defensive play*". A real plug and play approach to coaching.

Why does this happen?

Laziness and/or a lack of knowledge!

Now, I am not wanting to attack anyone following this approach – it's totally understandable, especially for volunteer coaches, who are there to help out local teams etc and want to bring some meaningful activity to their sessions each week.

But this is where the danger lies!

We have social platforms for self-appointed experts, who copy and paste ideas and activities without understanding them. These are then implemented by people who have even less understanding. And let's not forget the biases that are out there about the game.

Certain ideas are latched onto more than others! Why? because they fit closest to current ideas, and rather than dealing with the cognitive dissonance (Google it!) caused by a paradigm shift (Google that too), they re-purpose what they have used before and give it a contemporary label.

The dangerous attraction of attractors!

If there is one area of dynamical systems, constraint-led approaches, and non-linear pedagogy (not the same things!) that is misunderstood, it is the concept of an '*attractor*'. An attractor is best described as a movement pattern that proves to be successful in achieving an outcome across different contexts. In other words – a movement solution that works! Hence the attraction to attractors! If we know a movement pattern that works in several contexts, let's just focus on being able to do the attractors and *Hey Presto!* Skilled performance!!



This knowledge then tends to lead to endless drills, whereby the player is put into the 'attractor position' and they repeatedly practice this movement pattern! Often with meagre consideration of a game context. Whereby the player gets to 'groove' or 'engrain' the movement pattern!

But that's where the danger lies, as **it's not that simple!**

This approach clearly shows a complete lack of understanding of attractors, let alone action-perception coupling, movement variability, the need to create degeneracy and so on!

Basically, what is happening is that these 'gurus' have taken the word *technique* and replaced it with the word *attractor* and then proceeded to do exactly what they did before! Demonstrating that they have zero understanding of dynamical systems, and most probably skill acquisition in general!

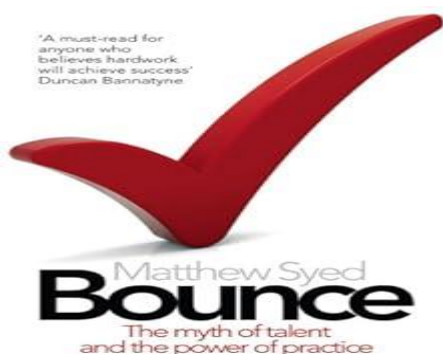
Let's take a look at a series of articles that seem to be streaming through the world of social media at present, we will call them "*The attractors fast bowling*".

Now, I don't want to turn this article into a full textbook on dynamical systems approaches to skill acquisition and sport coaching (although it may well be a future project as its obviously needed!); but a few explanations around some of the key terms are appropriate here.

Attractors (see above) are best described as a movement pattern that proves to be successful in achieving an outcome across different contexts. In other words – a movement solution that works.

Affordances can be defined as invitations within the environment to act. They are information sources that organisms perceive within the environment, and therefore are dependent on perception by the unique individual. Affordances are based on our ability to perceive (*perception*) and our capability to act (*action*) – and so we have this concept of *perception-action coupling*. Research has repeatedly demonstrated that experts perceive the environment differently to novices. It is their ability to perceive the most relevant cues (information) from the environment and act upon these quicker than the opposition, and that gives them the advantage in performance. Therefore, affordances are ONLY available to those capable of perceiving them and that have the action capabilities to be able to use these affordances appropriately. All of which is very individual!

A great example of the individuality as well as specificity of action-perception in action is given by Matthew Syed in his book *Bounce*. Syed is a former world number one table tennis player but talked about his inability to return serve from a professional tennis player. While he clearly had similar game knowledge, and lightning fast reflexes for table tennis, this did not carry over to him in tennis, as he was unable to respond appropriately and in time (in other words, *affordances weren't available to him*).



The moral to this story – if the affordances aren't available and/or if there's a lack of action capability, there are NO ATTRACTORS! Sports technique does not happen in a vacuum! (Although some

coaches would have you believe that it does by looking at their coaching practices). So endless drilling of “*attractors*” is meaningless!

So what is *actually* going on?

A lot of the original work in this area was related to an article published by Worthington, King & Ransom in 2013 (see: *Worthington, P. J., King, M. A., & Ransom, C. A. (2013). Relationships between fast bowling technique and ball release speed in cricket. Journal of applied biomechanics, 29(1), 78-84*), which suggested that 74% of bowling release speed could be predicted by just four factors:

“The results indicate that the fastest bowlers have a quicker run-up and maintain a straighter knee throughout the front foot contact phase. The fastest bowlers were also observed to exhibit larger amounts of upper trunk flexion up to ball release and to delay the onset of arm circumduction” (p.78).

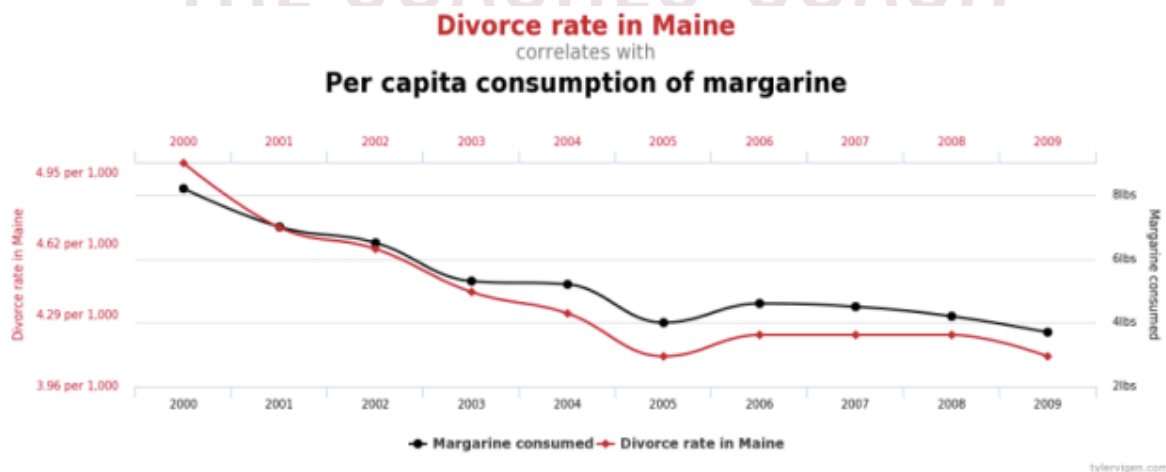
This set various gurus on their quest – tell every fast-bowler that they *must* run faster, have a “*braced front leg*”, and do lots of “*hip-shoulder separation to increase bowling arm delay*”.

So far so good I hear you say! (These also align quite nicely to a lot of what Ian Pont first propositioned with his *Four Tent Peg* model which is based on sound biomechanical principles).

But hold on just for a moment!

This predicted 74% of release speed of *these specific bowlers in this study!* NOT ALL BOWLERS! It only accounts for 74% of the speed and not 100%, and we have NO IDEA from this research whether or not this is suitable for ALL bowlers! This research shows a CORRELATIONAL RELATIONSHIP AND NOT CAUSE AND EFFECT!

As a side note on correlations – did you know that there is an excellent correlation between margarine consumption and divorce rates in the USA?



Anyway, back to cricket and the Worthington et al (2013) study of fast-bowlers:

Let’s look at each of these factors in turn:

1. Run faster – sounds great in principle and is based on some pretty clear laws of mechanics - the faster the centre of mass of the bowler going into the delivery stride, the greater the momentum, and thus greater impulse available to use the ground reaction forces and convert them into accelerating the bowling arm. That is AS LONG AS THE BOWLER CAN COORDINATE THEMSELVES WITH THIS GREATER APPROACH SPEED AND HIGHER GROUND

REACTION AND BRAKING FORCES! This requires large amounts of eccentric braking forces and isometric stabilising forces. Does EVERY bowler have these?? I think NOT! Therefore, this advice in isolation is dangerous.

2. Braced front leg – otherwise interpreted as a complete straight front leg. While this position makes good sense from a mechanics perspective, it is again dependent on other things. Firstly – has front foot contact (FFC) occurred through the heel, the flat of the foot or toes? A heel landing and straight front leg are functional – we see this in gait (walking). However, trying to land the front leg on the toes, with a braced front leg is asking for trouble!! Also, we know that many of the fastest bowlers in the world (e.g. Shaun Tait; Harold Larwood), bowled without a braced and straight front leg. If the straight front leg position was as essential as the *gurus* suggest, this would not happen; but it clearly does!
3. Trunk flexion – how much the trunk flexes depends on a series of other movement patterns and movement capabilities – not all bowlers are able to do this! In addition, what I often see when bowlers try to overemphasise this, tends to lead to greater lateral (side) flexion, which can be problematic.
4. Delay onset of arm circumduction – in order for there to be a delay, other aspects of the action need to have taken place! This is not something to be coached in isolation! (Although again, I see people trying). The path of arm circumduction is also, in part dependent on the active range of motion (RoM) that the shoulder joint AND shoulder girdle are capable of carrying out. Do any of these gurus suggest checking how capable their bowlers are in this area???? (No, I didn't think so either!).

So, as we can see, while it's great that we have coaches working with bowlers from an evidence-informed perspective, there has been wholesale generalisation to the whole population here that cannot be justified. For example, looking at the bowlers in this study:

“All (20) bowlers were members of the England and Wales Cricket Board's (ECB) elite fast bowling group—being either current England bowlers or identified as likely to play for England in the next three to five years” (p. 79).

Bowlers that have all come through a similar system with similar coaching approaches. Do you think we would have seen the same findings if the bowlers under investigation were Lashith Malinga, Shaun Tait, Mike Proctor, Harold Larwood, Patrick Patterson, Malcolm Marshall, Sohail Tanvir and Wasim Akram?



I'd suggest that while there would be similarities (especially at the point of release), there would clearly be differences also. Imagine trying to get any of the above bowlers trying to follow ALL FOUR

of these attractors? My guess is you would do more harm than good (I can hear Shaun Tait's left knee wincing at the prospect!).

Also, are 20 elite male fast bowlers of around 20 years of age comparable to 15 year old male fast-bowlers? Or even 35 year male fast-bowlers? What about female fast-bowlers? Do bowlers in England bowl in the same way as say bowlers in Pakistan? Should we use the same template for all?

What about different variations of the game? Should test bowlers use the same technique in an Ashes Test Vs. IPL Vs The Hundred Vs. League cricket? Should fast-bowlers use exactly the same techniques in the same spell? (More on this in an academic paper I'm writing for journal publication).

More Attractors!

Our online gurus though are not finished there though! Because no longer are there four attractors for fast-bowling! Depending on your choice of guru there are five, or six or is it seven????

But where on earth do they get these 'attractors' from?

Well, our online gurus are seeing pictures or videos of star performers in action, noting one particular phase or body part movement or peculiarity, and then suggesting that this is the 'secret sauce'/life hack/attractor for fast-bowling!!

A good example of this is the myth of "knee drive". If you look at any of the world's best (male) fast-bowlers, you see the back knee 'driving through' the point of release. Our eyes are not deceiving us, the knee does 'drive through'! However, this has then suddenly been interpreted as an active part of the fast-bowling action. Worse still, I have then seen coaches/gurus putting down hurdles for their fast-bowlers to 'drive the back leg up and over/through'. The slight problem to all of this is the fact that the knee drive is NOT an active process! The back leg gets 'pulled through' by the upper body and in preparation for landing the next stride! (See *Ferdinands, R. E., Sinclair, P. J., Stuelcken, M. C., & Greene, A. (2014). Rear leg kinematics and kinetics in cricket fast bowling. Sports Technology, 7(1-2), 52-61* for a detailed review). It certainly shouldn't be lifted up either! So, not only are our gurus doing something completely irrelevant, but the use of the hurdle also changes the movement pattern of the bowling action, and particularly negatively impacts upon the pelvis and spine (as well as generally ruining the technique!).

The latest 'attractor of fast-bowling' that I have noticed is the 'wrist snap'! Which is basically trying to emphasise the amount flexion/extension at the wrist during the bowling action release phase. However, having seen the videos of *gurus* suggesting this, what can't help being noticed from these videos is that while emphasising flexion and extension of the wrist, we are also seeing greater flexion and extension of the elbow – have any of these wise men come across the ICC regulations regarding throwing in bowling?



Let's hope that Jofra Archer, Pat Cummins, Mohammed Shami, Jasprit Bumrah and Kagiso Rabada all don't start scratching their backsides at the beginning of their respective run-ups! Who knows what will be the next *secret sauce*!



Batting Gurus!

Now, in the interest of fairness, it isn't just the fast-bowling coach *gurus* running around copying and pasting everything (including everything that Steffan Jones has done and tried to claim it as their own!). There's some pretty bizarre stuff out there in the name of batting coaching.

A quick flick through Instagram this morning has shown some amazing videos of batters doing all kinds of crazy stuff! There's the endless drills hitting from tees (good for golfers, not so great for batters!) and the equally as poor hitting the ball dropped from their coach (or their chin!). The champion this morning has to be the batter in full kit, stepping towards a ball placed on the floor, picking the ball up from the floor and returning back in stance; and then placing the ball back again and repeat?!?!? Handled ball!!!!!!!!!!!!!!!!????????? And don't get me started with the drop-feed for a square and late cut with the coach standing BEHIND the batter! I find batting hard enough, don't make me have to look behind as well as in front of me!



Why are we doing this stuff?!?!

I've heard various excuses (sorry, well thought out cognitive decisions based on strong knowledge-bases) over the years, that are based around giving the batter a *'feel for the correct technique'*.... and there we go on again, this concept of an ideal/correct technique (with an associated aesthetic quality don't forget). Now I don't want to be shattering any illusions here but:

There is no such thing as an ideal technique in isolation!

Sorry!

Technique is a movement-solution based upon the demands of the task, the environment, and the resources of the player. So there might be an ideal technique in any given time and space, but all of that changes! So, what we are really after is an ability to repeatedly achieve a certain level of outcome, using various technique variations and not a repeated technique that we use in all circumstances in the hope of achieving the desired outcome! In other words, we want *dexterity*. Dexterity in movement solutions comes from our ability to adapt our technique, not to nail it down to only one 'ideal'.

Confusion between skill and technique

One area that seems to draw much confusion and might be why we have an exaggerated focus on technique in cricket, is that many coaches and cricket *'experts'* (including TV pundits!) is knowing the difference between a *skill* and a *technique*. Because, if these *experts* knew this, I am sure we would see and hear a very different emphasis in our coaching and training approaches as well as TV commentary.

A technique may be defined as *a coordination of body parts to form a movement pattern applied to a specific movement/sporting task*. Whereas a skill can be considered as *the ability to select and use the appropriate technique for the required task to achieve an outcome*. In other words, the technique is how we coordinate and move our body in a given task, whereas a skill is the ability to consistently achieve an outcome. Clearly, skilled development is what we require in coaching if we are to get better sports performances; technical work on its own will not do this! Unfortunately, the coaching practices of many coaches at ALL LEVELS of the game of cricket, do not reflect this understanding sadly.



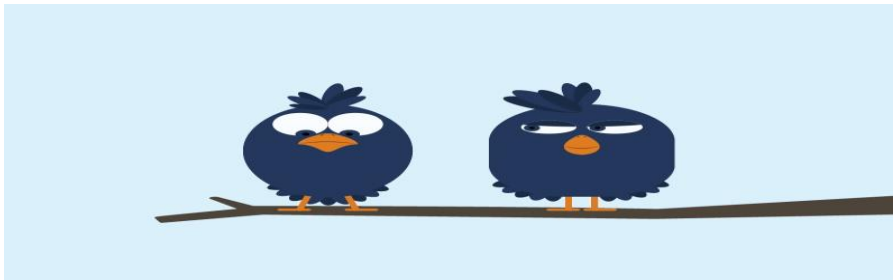
Skilled performance requires movement dexterity and NOT highly specific technical mastery.

Confusion between skill acquisition and strength & conditioning

Another problem we have is a lack of understanding between strength & conditioning (S&C) to build potential in a player and skill acquisition, that builds **skill** (NOT TECHNIQUE).

S&C training should build the potential within the athlete, so that they can convert that potential into enhanced sport performance. If the S&C activities don't carryover into sport performance in any way, our efforts are wasted. Equally, activities designed to enhance sports performance through increasing skilled-action need to do that. But what we are seeing quite often, are sessions that are a cross between skill acquisition activities and a fitness circuit!

Sounds good – two birds, one stone and all that!



The only problem is that neither tends to be achieved! Added to this is that this type of activity is usually done with youth players – who are all developing and maturing physically and mentally at different rates.

“One man’s meat is another man’s poison!”

Verkhoshansky and Siff, in their seminal text *“Super-training”* of the 1990’s, pointed out that just sticking resistance onto a sports technique is not only poor fitness training, but also can negatively impact upon the athlete’s ability to perform that technique with the same precision. Yet, we see cricketers being asked to perform cricket skills with all manner of resistances, without any consideration of the adaptations from the players taking place.



And then there is the consideration of the *type of resistance* that is being used. Sticking heavier weights on players increases the *vertical* component of the force only. There was a brief craze of putting weighted vests on sprinters. They found that the increases in speed were limited, but interestingly, the sprinters were ‘bouncier’ in their running technique, i.e. they moved up and down more; and so they should, they got better at overcoming *vertical force* – shame they were having to cover ground horizontally as well! 😊.

The same effect happens when we get people to bound and jump over things, the vertical component of force increases, so players either adapt and become bouncier, or just have to work harder as they collapse into the floor. Neither of which tends to improve cricket performance.

Then there is elastic resistance. The use of this allows to apply forces in different planes of motion (directions) rather than just up and down. So, we see players being asked to do lots of different cricket techniques, against a resistance band. While this can allow us to apply force more in the line of the action that we want to take place, there are still some issues, not least the nature of the resistance itself. This is where coaches need to be aware of the difference between kinematics (movement patterns) and kinetics (the forces, accelerations and torques produced) of the technique.



If we use throwing against a bungee cord resistance as an illustration, the bungee allows the player to use the appropriate movement patterns (kinematics) to a certain degree, against a resistance. So, big plus points on kinematics. However, the kinetics of this are wrong, in fact, the opposite of what we want. As resistance increases, our movement speed decreases (it's harder to move!). The bungee cord will have its greater resistance at the end of the movement and its least resistance at the beginning. Therefore it is easier to move quickly at the beginning and harder at the end, i.e. it means we end up decelerating what the throwing arm is capable of! And not increasing it, which is what we are really looking for. As a side note, if we turn the bungee cord around, so that the resistance *pulls the arm* through, we can actually do a form of training called *overspeed*, where the bungee cord allows the arm to move faster than it would normally be capable of doing, this then trains the neuromuscular system to operate faster. Overspeed training has been used extensively in sprinting and throwing events since the 1960's Soviet Union's athletic dominance. However, I would NOT recommend using this type of training unless you have a thorough understanding of this area, otherwise you will be towing all your fast bowlers on the back of your cars! 😊

So, as you can see, a little bit of knowledge can be dangerous!



And while all this is going on, we are hoping that some how this 'skills circuit' is going to some how increase cricket skill!

"But Harvey, we want to challenge cricket skill under fatigue like we would in a game!"

Well!! Remember our point from earlier – skilled performance doesn't happen in isolation! There's no cricket skill being challenged under the conditions of fatigue in many of these sessions, because

there is no SKILL being performed! There are *cricket poses* that look like some of the stuff you see in a game – but these are not SKILLS.

Copy and paste -part two!

“But I see experts doing this, so why can’t I just copy?”

This one I hear a lot, especially when it comes to the work of my friend Steffan Jones. Steffan is a force of nature, someone who has dedicated his life to understanding what it takes to enable fast-bowlers to bowl faster. He has taken knowledge and understanding from cricket, S&C, javelin/athletic throws coaches, as well as sprint coaches, incorporated elements of dynamical systems and also used the latest technologies far more than anyone else I know. He has pulled it together into what is his Pace Lab system. Steffan has produced so much material, highlighting the detail and science behind how and why it works. Which is great! However, there is a small problem not everyone actually understands any of it, let alone all of it!

But *online gurus* don’t let a small thing like having no understanding of the science behind an approach get in the way of their copying and pasting and taking credit!! Let’s not forget, we are in the era of ‘post-truth’, AI engineering and straight forward copyright theft!

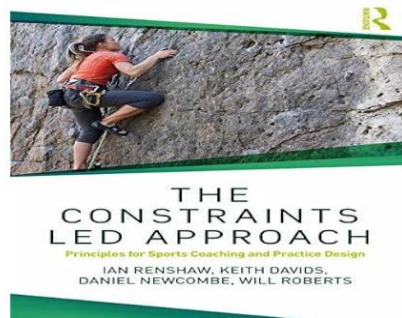


So, we see lots of good quality work from the likes of Steffan Jones, Ian Pont and Julian Wood being copied & pasted into some *guru’s* approach, without understanding the mechanisms behind what is being demonstrated. An example that springs to mind was seeing a ‘*power hitting*’ drill that I had seen Julian Wood use. The batter hops backward over a low hurdle (which for the record isn’t required) and then immediately strikes a heavy ball fed from the coach. The purpose of the drill was to give the batter a feel for eccentrically loading (increasing the muscle length under tension) the back hip/pelvis, before explosively stepping into striking a big hit, to use the stretch shortening cycle driven from the pelvis and rear hip. What, however, was being demonstrated on the *guru video* was a young lad hopping backwards over hurdles, landing awkwardly, stabilising and then having a swipe at an underarm delivered tennis ball! No proprioception created in the rear hip/pelvis, no stretch-shortening cycle enacted, no kinetic chain created from legs up through the body to hands, and no skilled execution.... in other words a complete waste of time! While this *guru* was shy about their level of background knowledge, they certainly weren’t shy to request people to use their services at an eye-watering cost!

Constraints-led approaches

The increase in awareness of Dynamical Systems approaches in sport coaching has not only led to the increased use of the term *attractors* but also the idea of *constraints-led approaches*. This approach refers to putting things in place (*constraints*) in order to influence the players’ perception-action coupling, that is, to put things in place that get players to come up with movement solutions that are more likely to be successful. Teaching Games for Understanding (TGFU), for me, is actually a good example of this (although many in both TGFU and CLA communities seem to completely

disagree). For example, if a coach wants a badminton player to work on lobs or smashes (or both), she/he can 'constrain' the badminton court width and get the players to try and win points in a narrow court structure. The only shots that are then likely to be played are lobs and either counter lobs (clearances) or smashes. In cricket, if we wish to encourage the batter's ability to play off their legs, we may create a game where they can only score on the legside, and all deliveries have to be on the wickets or slightly to the legside otherwise they're deemed as 'wide' and penalised. Note here that we would be working on skills and not specifically technique (techniques can also be improved using this approach – see later).



There are several really good books out there to help coaches use this approach. However, just by putting a constraint on a player and asking them to perform a movement, IS NOT A CONSTRAINTS-LED APPROACH!

Just because the player is constrained by position, e.g. bowling, or throwing from a kneeling position, or having various limbs tied up/tied in, it's not a CLA approach!

Why?

Because we have to understand perception-action coupling! The constraints should be there so that the player *attends to the affordances* available to them and their current *action capabilities* in order to *produce a skilled outcome*. Just constraining someone in some way isn't enough! (No Fifty Shades of Grey here!). We need to understand the interactions between the player(s), what the task or skill is that we want them to produce, when where and how. We want to set-up practice tasks that are going to enhance skills that the players will *actually use* in the game(s) that you are preparing for. While we as coaches, through our knowledge and experience, know that certain methods tend to work better than others in certain situations/contexts, it is critical that the players find these movement-solutions themselves. It is all too easy to give the player the textbook '*answers*', but this takes away the important steps of learning, and also assumes that the 'correct' answers are in fact the correct answers, the only answers or even the best answers! (again, not always the case – see Glen Maxwell's World Cup double-hundred for why footwork IS NOT A FUNDAMENTAL ELEMENT OF BATTING!).

And then...*What about creativity?*

Let's not go there! (well not in this article anyway 😊).

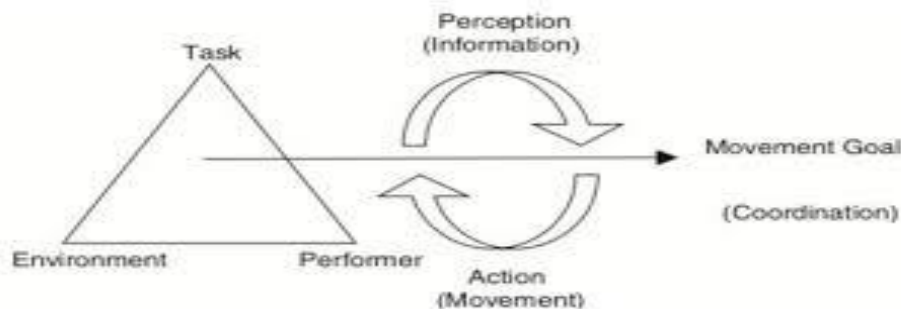
So what is the answer?

The answer is this – *criticality, understanding, expertise and evidence!*

Without these we are, at best, guessing!

Some theory to finish

A nice little theoretical framework that I feel comes in very handy here, is what is commonly termed 'Newell's Constraints Model'.



This model holds that there is a dynamic interaction between the player (e.g. batter), the task at hand (e.g. batting against a certain set of bowlers), and in a certain environment (e.g. game played under 50 overs aside rules, on a 'green' UK wicket in April). All three of these factors impact the information available to complete the task for the batter (and whether the batter can use this information – *perception*) and movement capabilities (e.g. skills and variety of techniques available). The outcome then is dependent on all these factors.

The skill of the coach then is to identify what outcome they are looking for, understand their players' capabilities, understand the environment that the activity is working within (and the context), and set up practices that maximise the opportunity for the players to explore ways of 'being successful' in the given task.

"Sport is physical problem solving" - Rod Thorpe (co-creator of the TGFU approach).

Therefore, as coaches, we become skilful problem-setters and set up practices to make our players better problem solvers.

It might be that the player has technical faults, and so the focus of the practice could be to enhance the players movement patterns in a given (realistic) practice context. It could be that the player's physical capabilities are lacking (e.g. eccentric strength of the leg muscles to be able to get into good positions at FFC), or it could be that a player is lacking confidence in conditions were the wicket spins prodigiously. It might be that you are using explosive training activities as a pre-cursor to a specific outcome e.g. maximum fast-bowling release speed (although this is S&C and not skill acquisition); the bowler then needs to take this newly developed potential and learn to create skilful performance with it.

By knowing what element we wish work on and why, we can then put constraints in place that challenge our players to produce appropriate skilled movement coordination patterns, while attending to the appropriate visual cues, in order to consistently achieved a performance outcome.

This is a very different approach to *"let's drill the perfect technique repeatedly"* and hope that the player can then somehow decipher the reality of a game situation and use this *'engrained perfect technique'* (while obviously looking really good doing it as that is important 😊).

Remember *why* you are training and what exactly you want to achieve – *"skilled sport performance!"*

So, the challenge is set – *can we get coaches asking better questions in their coaching practices so that their players improve their skill base via problem-solving?*

Can we move away from the ideas of a 'perfect technique'?

Can we value skilled performance (think Don Bradman or Muttiah Muralitharan) over nice looking techniques?

Can we build our own coaching practices, rather than following the latest gurus life-hacks/attractors/drill of the week approaches?

Can we get coaches interested in what people with actual expertise in an area of coaching/sport/science have to share as opposed to people with expertise in getting large followings on social media but with no knowledge background?



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