A Constraint-led Approach for P.E. Teachers

The Game Sense coaching approach emphasises the modification of game elements or the development of modified games to achieve learning outcomes. In this article we will introduce the constraint-led approach to learning and demonstrate how the theory can underpin the design of games lessons ensuring that teachers give themselves the best chance of satisfying the skill acquisition and psychological needs of every child in P.E.

Ian Renshaw, Brendan Moy & Michael Cook
Queensland University of Technology

How many 'non-participants' are there in an average year 7 class, compared with a year 9 or 11 class? If your class is typical, you are more likely to have more 'notes from mum' in the latter school years. It would seem that the more P.E. that children are exposed to, the more they don't want to take part. As passionate P.E. teachers we need to ask ourselves why?

Clearly, it seems that at present, the majority of P.E. lessons are only meeting the needs of some students and it is incumbent upon advocates for P.E. to try and identify what is it about the sessions that is wrong? To answer this question, we can consider session design and how it impacts on the teacher's interactions with students. The way that the lesson activities and instructions and feedback impacts on how the student feels, thinks and acts (Renshaw, Oldham & Bawden, 2012). For example, in a traditional P.E. lesson interactions are usually focussed on improving performance by helping students to improve technique and then use them in competition or games. This approach is underpinned by a commonly held belief in teaching and coaching; "how can they play a game if they don't have good technique?" Requiring children to acquire a 'good' technique based on a textbook coaching model has some important consequences for children. To understand this it is important to consider what each child brings to the session. For example, Child A (David) may have had many hours of experience in the target sport. When David asked to perform a specific technique, he/she is likely to feel and

act confidently as they know they know they will be good at it. Child B (Helen), may not have played the sport, but has played similar sports successfully and will most likely "have a go" as she thinks she will be OK. Child C (Lisa) is not sporty and is immediately worried because she knows she can't do and thinks that she will look stupid. She also knows that when she can't do it, the teacher will come and try and 'help' by telling her that she is doing it wrong and what she needs to do to put it right. Consequently, the teacher will watch her for a few minutes before saying something along the lines of, "good work Lisa, keep trying and it will come". Lisa can then have a big sigh of relief as the teacher will and stop the exquisite torture, both in the tacit understanding that Lisa is just not sporty at all, but does try hard! Is it any wonder that the goal of some children in P.E. is to avoid showing their incompetence and consequently find creative ways to avoid talking part?

Forcing children to attempt to conform to a 'model' condemns the majority of them to fail before they even start. We can give a good example of this from the experience of the lead author from whose perspective this story is now told. Many years ago I had been working with a badminton coach who had devised a coaching device (i.e., a shuttlecock suspended in the air on a string attached to a stick) to help young players to learn a good technique for hitting overhead shots without worrying about having to time their movements to the flight of the shuttle'. I therefore spent some

time getting the young player to learn to hit with the 'correct technique'. After a few goes, the young player could replicate my model and it was time for the real thing. I hit up some gentle lobs and encouraged her to hit with the swing she had just learned. Unfortunately, the first four or five attempts resulted in complete failure, with the timing of the swing not being matched with the flight path of the shuttle. She was frustrated and a little humiliated and embarrassed. I kept encouraging her but I was really not sure why she couldn't hit it. Fortunately, the young player was much more intelligent than me and solved the problem for herself on the next go, and the next one and the next one. I guess I could have insisted that she went back to trying to hit with a full swing, but like most of you (I imagine), I was simply happy that she was hitting it not matter what the technique looked like.

This was an important lesson, and highlighted that some initial success was far more important than developing a proper technique; the big, beaming success smile was reward enough! When I sat back and worked out what she had done, I realised that she had not used a full swing, but had frozen all her body movements and simply used her forearm to 'tap' the shuttlecock back to me. At the time I did not know that 'freezing up most body parts (i.e., freezing the degrees of freedom-see Davids, Button & Bennett, 2008 for a detailed explanation)' was a common strategy for beginners when using all body parts simply made it too difficult. This example demonstrates why asking children to copy a 'perfect'

model is not useful and leads to failure and its commensurate negative emotions, thoughts and actions.

The structure of a P.E. lesson also significantly impacts on the psychology of young learners. P.E. teachers are historically wary of asking children to perform technical skills in complex environments and as such use 'closed drills' which isolate technical skill from perceptual and decision making skills in order to help children develop the correct co-ordination patterns, before requiring them to perform them in the more chaotic game environment. While drills are easy to organise, and can make it easier to facilitate 'teaching' and give feedback, especially when the sport is not a specialist area, a major problem is that children find them dull and boring and they often have little transfer to the real game. Again, Renshaw will share one of his own experiences to illustrate this point. In my year 9, rugby union lesson, many of the boys panicked when they were tackled and threw the ball away. To solve this problem, as an inexperienced rugby coach at that time, I went to my rugby coaching books and sought out the best drill to address this issue. I therefore put them in groups of eight, with four kneeling down on four corners of a grid while the other four proceeded around the square and took turns to be tackled and 'set the ball in concrete'. After 20 minutes they all seemed to have got it, so I decided it was time to put their new technique into a game. Unfortunately, on the first tackle, the ball carrier reverted back to his earlier actions and threw the ball away; back to square one I thought!

These two real world examples show, at least for us, that the traditional approach is failing our children. So then, what are the alternatives? Our own experiences have led us to develop a more game based approach to developing skills in line with the Game Sense Approach allied to contemporary motor learning theory. More recently, we have developed the principles and ideas of ecological dynamics via a Nonlinear Pedagogy

(NLP). In P.E. and sport coaching, NLP has been expressed mainly through the implementation of a constraint-led pedagogy (see Renshaw, Davids, Shuttleworth & Hammond, 2010; Moy, Renshaw & Davids, 2014). Key to understanding how to implement 'constraints' is to accept that the individual's emotions, thoughts and actions are shaped in conjunction with their environment. In P.E., this means the physical as well as the cultural environment. Thus, factors such the weather conditions, the nature of the playing surface as well as the over-arching culture of the school, the climate created by the teacher, and the influence of others in the class will all influence individual behaviour.

The importance of others involved in games is essential for teachers to appreciate as it emphasises complex game behaviours. For example, making a decision to execute a long pass emerges as a result of the awareness of the individual in relation to his/her own action capabilities in regards to passing (i.e., how far can I pass it off my left hand, how accurate am I over that distance), teammates action capabilities to catch (i.e., the receiver is a good catcher of long spiral passes), and the oppositions' action capabilities (their ability to read the pass and speed to intercept it). The final decision to pass may also take into consideration the expected response of the teacher if the pass fails. A second key principle underpinning 'constraints' is that individuals have the capability to self-organise their actions without instruction.

A good example of this is to that babies still learn to walk without carefully prescribed parental instructions. In fact, although most children end up the same in terms of co-ordination, individual babies use a range of strategies to get there. This is a good point for teachers to remember and highlights that allowing self-organisation results in individual exploration to eventually find their own best solution. An example of this is the badminton player mentioned earlier in the article who solved the

problem herself. Hand-in-hand with self-organisation is the idea that emerging actions are shaped by the effect of interacting constraints or 'boundaries'.

These constraints can be put into three categories. First, *individual* constraints, such as size, fitness, intentions, goals and emotions. Second, *environmental constraints* which were discussed earlier and finally, *task constraints* that include factors such as rules of games, equipment used, boundary playing areas and markings, nets and goals, the number of players involved in a practice task, and the information sources present in specific performance contexts. For P.E. teachers, task constraints are particularly important as they can be most easily manipulated to channel the acquisition of specific coordination patterns and decision-making behaviours (Renshaw et al., 2010). For example, to address the ball control problems of his rugby players, Renshaw manipulated task constraints in a small-sided rugby game; that is, rules were changed allowing players to find their own solution through allowing self-organisation under constraints. In a game of 8 vs. 8 the players were told that if they could 'set the ball' on the ground correctly after a tackle, their team would get a 'free pass', with the nearest supporting player acting as the scrum half (half back). The results were almost instantly positive, but also had some unexpected consequences. Not only did the tackled player set the ball correctly, it resulted in the other players lining up for 'second phase' play, a concept that non-rugby players brought up in a football (soccer) culture found particularly hard to do.

The acquisition of the technical skill of controlling the ball within a game situation allowed a change of focus for the lesson to one of improving perception and decision making. This allowed the teacher to encourage the acting scrum half to look at the positioning of defenders and make appropriate decisions about where to continue the attack after the tackle; to get the head up and make

a decision about whether to attack alone (going to the blind or open side), or to make a pass to the open side or blind side. A knock-on effect of these practice task constraints is that they can provide many opportunities for players to experience 4 vs. 3, 3 vs. 2 and 2 vs. 1 sub-phases of the game. Another key idea adopted was to ensure that the 'mini-game' adopted was representative of specific phases found in the full game, however, it was simplified by having less numbers in the game. In fact, the rule change had an unexpected effect as it made the game that the students were playing, more representative of 'proper' rugby games as it created 'phase' play that they had not been able to do beforehand.

It is worth noting at this point that adopting a constraints-led approach does not mean that technique is neglected per se. Rather there is an acknowledgement that because of the uniqueness of each individual the "textbook technique" mantra is ignored. However, if "poor" technique is impacting negatively on performance then it would still be addressed the difference is that we would look to do this in authentic learning environments that allow the emergence of functional perception-action couplings. Put another way, actions must be learned in environments that contain the key information sources present in games and therefore result in the emergence of actions that work in the game.

Summary

In summary, in the constraint-led approach the key premise is the inter-twined relationship between the individual and environment. This means that the P.E. teacher needs to ensure that learning environments include key information sources that enable the emergence of functional perception-action couplings. The ability of individuals to self-organise under the influence of interacting individual, environmental and task constraints means that instructions should not be prescriptive and involve setting only general goals. Solutions emerge through exploration and due to the interaction of unique constraints there is no one optimal way of solving performance problems. Finally, we would suggest that constraint-led coaching is a creative process and can lead to innovative and creative performances by students empowered to take ownership in their actions through facilitative rather than directive teaching. It is worth noting that adopting a constraint-led approach requires careful thought by the teacher and we would encourage those interested to further explore key resources to develop a deeper understanding of the approach. However, (and yes, we would say this wouldn't we!), we believe that the rewards of learning to utilise this approach will result in lessons that meet both you and your students psychological and skill learning goals. To paraphrase one of our students "adopting a constraint-led approach will mean that students do not have to suffer 50 minutes of pain for 10 minutes of game typical of the traditional teaching approach to games". Exposure of a constraint-led approach to our student P.E. teachers has opened their eyes to the possibilities and we finish with this comment from Jodie, a student Primary school teacher:

PE at my school was all about drills and more drills. I thought that the only way to learn a skill was by doing these repetitive boring drills. However this wasn't working for me. When I started studying [the constraint-led games unit] and participating I found that I learnt more in a few weeks in regards to skill than I have ever before in all my years of PE at school. HMB315 also allowed me to learn skills, have fun, be engaged in the activities and be intrinsically motivated. My beliefs on how to teach PE have completely changed. It was a very enjoyable experience.

We hope her experiences will act as an encouragement to you to consider this approach.

References

Davids, K., C. Button, and S.J. Bennett. 2008. Dynamics of skill acquisition: A constraints-led approach. Champaign, IL: Human Kinetics.

Moy, B., Renshaw, I., & Davids, K. (2014). Variations in acculturation and Australian PETE students' receptiveness to an alternative pedagogical approach to games teaching. P.E & Sport Pedagogy,

Renshaw, I., Davids, K., Chow, J., & Hammond, J. (2010). A constraints-led perspective to understanding skill acquisition and game play: A basis for integration of motor learning theory and physical education praxis? *P.E. & Sport Pedagogy, 15*(2), 117-131.

Renshaw, I., Oldham, A.R.H. & Bawden, M. (2012). Nonlinear pedagogy underpins intrinsic motivation in sports coaching. *Open Science Journal*, 5, (suppl 1-M10), 88-99.

About the Authors

To come.

To come.

To come.

To come.

To come.

To come.

To come.

To come.

To come.

To come.