basketballscotland

constructively aligned principles for coaching youth basketball

(adapted from Muir et al., 2015)

player engagement
- Active (physically and mentally) and excited to return
- Lots of varied skill attempts in game-like situations
- Competitive and focussed on personal improvement

activity design
- *Purposeful*, simplified games (moment, problem, direction, opposition and consequences)
- *Planned* curriculum themes (with a broad and balanced curriculum)
- Gamified, representative drills (where perception-action is coupled)

session planning
- Arrival activities (RAMP principle)
- Game > Skill development > Game
- Differentiated competition to accommodate a range of ability levels
- Systems for recognising and rewarding individual improvement and celebrating success

coach behaviours
- *Praise* success (define success and then 'catch them being good')
- *Prompts*, not lectures ('fly-by' coaching)
- Tactical questioning and mini-discussions
- Use externally focussed instructions, metaphors and analogies

objectives
1. Retain players in sport (transition into talent or participation programmes)
2. Create an environment focussed on fun and individual improvement
3. Develop a range of skills and a sense of attachment to the game
   Patience in long-term development

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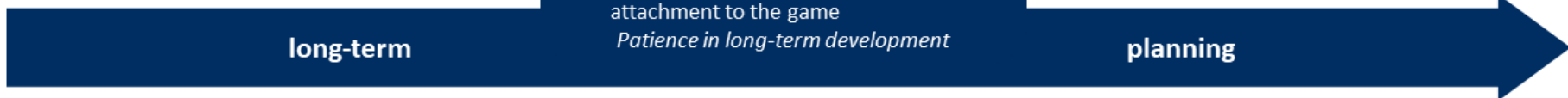
Constructively aligned principles for coaching youth basketball:
a framework

In this document we aim to describe and explain the principles for coaching youth basketball to pre-adolescent players. The principles are illustrated through the videos that accompany these resources, but each principle, the relationships between them, and the evidence-based behind them deserve some attention in order to support caches wishing to apply the ideas with maximum impact.

What is 'constructive alignment'?

Before we get into specific principles, it is worth taking a moment to explain the *big* idea behind this framework. Constructive alignment is a principle many teachers and lecturers use when planning how they will design and deliver curricula[1]. The idea is that you start by thinking very carefully about the objectives and outcomes you want the learners to achieve, then 'align' your activities and behaviours to give the learners the best chance of achieving those outcomes. This idea was adapted by colleagues at Leeds Beckett University to create the coach planning, practice, and reflective framework (or CPPRF), which has since been adopted by UK Coaching in a range of coach development programmes[2]. Coaches can use the framework to help them think about how they plan and review their practices: What activities will help the players achieve the outcome? What kinds of behaviours could I use to support them towards the goal? What will positive engagement look like if I'm getting it right?

Starting at the bottom of the framework, the first job is to define the *objectives*, which might be long-, medium- or short-term in nature. In many cases, this might be just imagining and writing down what you want players to be able to do at the end of a session or a period of work (e.g. they will be able to look and pass ahead when teammates are running ahead in transition situations). You would then design *activities* to enable them to experience meeting the outcome (e.g. small-sided games with frequent transitions) and *behaviours* you want to use alongside them (e.g. questioning players on when is a good time to pass ahead). You then imagine what successful *engagement* in the session would look like (e.g. players will get at least five offensive transition opportunities every minute and they will be looking ahead and passing ahead in more than half of those opportunities). This is extremely useful when reviewing and reflecting on sessions as you will have clear expectations that were either met, exceeded, or foiled.

In the sections below we explain in more detail the principles populating the framework and share some of the evidence for *why* they are useful and effective principles in the notes at the end of the document.

OBJECTIVES

Retain players in the sport (and transition into talent and participation programmes).

This is the *primary* objective at this stage but is achieved through meeting the two more specific objectives below. It is a simple goal, but one we need to keep in mind as too many players leave the game each year due to poor coaching[3]. In line with Basketball Scotland's strategic plan, coaches play an important role in developing clubs through supporting positive early player experiences. More players in clubs not only grows the base of the talent pathway but also brings more resource into the game, along with willing volunteers (referees, table officials, coaches etc.). To continue to grow the game it is essential that coaches focus on the more immediate objectives listed below. This will mean that, in the long-term, the many benefits of playing basketball – for movement development, health and fitness, social engagement, as well as the simple fun of playing the game – are experienced by more people.

Create an environment focussed on fun and individual improvement.

When asked *why* they take part in sport, children almost always talk about 'fun' and 'enjoyment'. But what do they enjoy about sport? When digging beneath the surface of what makes sport fun, we find that children really enjoy the feeling of getting better at something and learning new skills[4] (they also like to be with friends). The need to feel competent is true of all people[5] but especially so of children between the ages of 6-12. Around this stage, children are especially susceptible to messages about how hard work can lead to improved competence[6]. If this message is not reinforced, it can lead to feelings of inferiority: that no matter how hard I try I cannot become good at basketball. Coaches therefore need to create an environment and activities that help to set clear and realistic expectations, praise accomplishments and make learning visible. Individual development – *not* team performance – should be the focus of what coaches talk about, recognise and reward at this stage.

Develop a range of skills and a sense of attachment to the game.

To support the objectives above, the main thing coaches should aim to do at this stage is focus mainly on developing skills and 'knowledge in' the game, leading to a feeling of attachment to the game. The curriculum or syllabus framework in this resource offers some ideas for the specific skills and tactical ideas (i.e. 'knowledge in' the game)[7] coaches could focus on around this stage to support this approach. Unfortunately, it is not uncommon for coaches at this stage to focus instead on team strategy (i.e. the 'Xs & Os') and team performances in leagues and competitions. Whilst some young people (typically the better, more experienced players) might be motivated by this, many will struggle to work out their place in the team and can confuse winning and losing with success and failure[8]. Sport psychologists have long argued that focussing on outcome goals (e.g. winning games, winning leagues, getting promoted etc.) can be demotivating, since outcomes are not in the players' control. Rather, we should focus on performances and the processes that underpin them[9]. A game plan or session plan could be focussed on the *process* of improving individual perimeter defence, rather than the outcome of the game. In this way, as players focus on getting better each session and each week, and the coach reinforces and offers feedback on these processes, players develop a love of the game and an ongoing commitment to playing. Conversely, if a coach prioritises game outcomes, and the team loses most weeks, players will feel a sense of failure, which is often cited as a reason for dropping out of sport. This is particularly stark in youth basketball in the UK, where limited competition structures often lead to uneven outcomes: one-sided blowout wins for stronger teams and demoralising losses for weaker squads.

PLAYER ENGAGEMENT

Players are… active (mentally and physically) and excited to return.

When they reviewed their coaching offer in 2015, the English FA created the 'DNA', part of which comprised their "how we coach" principles. One of the most controversial principles they introduced was that all sessions should aim for 70% "ball rolling time". This target represented a clear effort to reduce the time coaches spent talking and players spend inactive. In research on children's PE, the percentage of Active Learning Time (ALT) in lessons is typically less than 50%[10]. The FA's target therefore represented an ambitious goal, but the aim was to shift coaches' practice in that direction. We would urge the same here and to strive for as much "ball bouncing time" as possible. One way coaches can increase ALT is to use more 'concurrent' instructions and feedback, without stopping an activity (Hastie, 1994). More activity also means more skill attempts, and, with positive concurrent feedback, this means players are more likely to want to return the following week (because they feel like they're getting better) (Cumming et al., 2007). If you want to check how much ball bouncing time you are achieving in your sessions, you can have an assistant or a parent measure this simply with a stopwatch: start when the players are active; stop when they're inactive (note: the research on ALT in PE suggests that players having relevant discussions and answering questions is still classed as being 'active').

Players are… engaged in lots of varied skill attempts in game-like situations.

The so-called 10,000 hour 'rule' was made famous by Malcolm Gladwell in his book, *Outliers* (also by Matthew Sayed in his book, *Bounce*). This 'rule' states that it takes 10,000 hours of deliberate practice to become an expert in anything (that's about 2 hours a day, every day, for 15 years!) Gladwell was drawing on research conducted by K. Anders Ericsson that involved expert musicians and reported in a flawed way – 10,000 was an average, but there was a big range, too – and has since been carefully debunked and explained (Ericsson, 2019). In short, deliberate or 'purposeful' practice has the following qualities: 1) it is goal directed and relevant, 2) it is individualised, 3) it is monitored and adapted, and 4) it involves high levels of feedback (from a coach, a teammate or the player themselves). We also know from research with youth footballers that 10,000 hours is an overestimation; it's likely that even the very best players accumulate around 4,000 hours by the time they become professionals (and, again, there's a range)[11]. So, what might 'purposeful practice' look like for us?

First, we would always want lots of relevant skills to be attempted. The easiest way of making skills 'relevant' is to ensure that activities in which skills are being practiced have the following simple qualities (of kinds of information)[12]:

1) They involve a ball;
2) They involve a direction of play (basketball is an invasion game);
3) They involve an opposition (this can range from passive-active);
4) They have consequences (e.g. if I make a mistake I lose the ball).

Second, by creating these conditions, it will ensure that skill attempts will vary. This is important as researchers have found that even the very best athletes in the world perform skills with what they call 'functional variability' (Renshaw & Chow, 2018). For example, it may look like Klay Thompson is shooting the exact same way every time, but, if you look closely, you will notice that he makes small changes to his release point depending on the location and height of a defender. This is functional variability, and it is a very important quality to develop, but can only be developed through lots of variable practice (e.g. practicing shooting against lots of different defenders, closing out at different speeds etc.) In short, we want players to have lots of

attempts at skills where 'information' is present, leading to the development of functional variability.

Players are… competitive and focussed on personal improvement.

Being *competitive* and being focussed on *winning* (i.e. the outcomes) are two very different things ([Cumming et al., 2007](#)). It is perfectly possibly (and desirable) for coaches to promote healthy competition during practices, *as long as the focus in on improvement over outcome*. One of the main mechanisms for getting better at the game is through playing games against players who are about the same level (or just a little better in some cases)[13]. Coaches should therefore create lots of competition opportunities in practice, through creating sub-groups or teams (or even 1v1s) where players of similar ability get to play against one another. Also, because young players improve rapidly at this stage, these groups should always remain flexible and responsive to changes in development[14].

So, how would you know if you're getting this right as a coach? Here are a few things you might notice:

- There would be lots of excitement and noise in the gym;
- Players of similar ability would be seeking each other out as competitors;
- Games and contests would be evenly matched most of the time;
- Players would be able to tell you how they are improving through competing.

ACTIVITY DESIGN

Purposeful, simplified games (moment, problem, direction, opposition, consequences).

As noted above, skill acquisition researchers and practitioners have recently offered useful frameworks for designing game-based activities ([O'Sullivan et al., 2021](#)). Also, since the 1980s, PE and games teachers have found success in a games-based approach where sessions *begin with simplified game-forms* that present problems to players, *before* any skill development work ([Harvey & Jarrett, 2013](#)). Following these research traditions, we advocate that coaches use 'purposeful' games that would be:

1) Rooted in a specific moment, presenting a specific problem;
2) Have a direction of play (i.e. players orient themselves towards a basket);
3) Have an opposition (i.e. it might be passive and underloaded early on);
4) Have consequences (e.g. winning the ball back on defence has a reward, such as getting to attack or score points).

The games that feature in the videos accompanying this resource are all designed around these principles and can be used and adapted according to the needs of the context. If the games are too difficult, for example, with players experiencing little success, coaches can use the **STEP** principle to think about making the **S**pace bigger, or giving players more **T**ime, modifying the **E**quipment, like lowering the rims, or just reducing the number of **P**layers. As long as games continue to present the problem and have a direction, opposition and consequences, everything else is flexible.

Planned curriculum themes (with a broad and balanced curriculum).

Back in the 1960s, the legendary educational psychologist, Jerome Bruner, developed the idea of the 'spiral curriculum'[15]. The basic idea of the spiral curriculum is that anyone attempting to teach a complex subject (like science, or basketball) needs to plan over very long periods of time. Such plans should be based around the things they 'judge critical' in the subject, which

become the *pillars* of a curriculum. Children then spiral around these critical pillars, repeating core concepts and developing skills in these areas. Basketball, like all invasion games, revolves around four defined 'moments' that are dependent on the state of the opposition[16]:

1) Defence to offence transition;
2) Offence to defence transition;
3) Offence against organised defence (in the half);
4) Defence against organised offence (in the half).

Further, when organised, you might have an advantage, or you need to create an advantage. We might argue, then, that the game consistently presents six problems to players, and these problems are the same regardless of the age or stage of the players:

1) How do we create transition?
2) How do we prevent transition?
3) How do we create advantages?
4) How do we prevent advantages?
5) How do we use (or pass on/extend) advantages?
6) How do we take away advantages?

We can argue that these problems are the critical problems of the game and therefore that they should form the basis of any broad and balanced curriculum. Purposeful and simplified games (see above) can therefore be created to present these problems to players. Also, note that the problems are paired opposites, which means the games can always be framed to work on either side of the ball. In this resource we offer a suggested curriculum or syllabus, based around these ideas, that coaches might want to use or adapt to their own contexts.

Gamified, representative drills (where perception-action are coupled).

In line with the session design principles (see below) and following a TGfU approach, we may want to break-out of games into 'drills' once the players have appreciated the *need* for a skill. For example, a game that rewards points for hitting cutters in the key might lead us to look more closely at the skill of cutting: how we prepare space, how we create contrast, how we signal etc. Drills are typically meant to increase the frequency of repetitions players get in trying a skill. One mistake many coaches make in designing drills is that they 'decompose' the task. A *skill* always involves perceiving and acting – e.g. feeling a defender on your high side (p) and spinning low (a) – so 'decomposition' is when the perceiving and acting parts of a skill are separated in a practice. If players are dribbling around chairs, or practicing shooting with no defender present, or passing to a teammate with no orientation to a basket, then perception and action have been separated; players are simply acting (not perceiving)[17]. They might be developing technique, but they're not becoming more skilful! By maintaining a link between perception and action, we can ensure that drills are always representative. What we want from drills, in short, is lots of 'repetition without repetition'; or, repeating the process of finding a solution, not just repeating a solution[18].

After this, we can also consider using principles of 'gamification' to generate increased interest and motivation. As noted above, we want players to feel like they're getting better; to notice they're becoming more competent. A good way to do this is to create time-bound drills where players achieve a score in a set time. You can then offer some advice, instructions, demonstrations and so on before trying again. As long as the time period is the same, players will often score better the second time, making their learning and development more visible and obvious.

COACH BEHAVIOURS

Praise success (define success and then 'catch them being good').

Praise and positive feedback has been shown to have lots of positive outcomes for young people in sport, from improved confidence and mental health, to improved skill development (Horn, 2019). In order to praise success effectively, we first need to have a shared idea of what success looks like. For this reason, it is useful, as all teachers do, to explain at the start of a session what a good outcome would be. This can then become a reference point for praise throughout the session. For example, if a session were focussed on offensive transition (see Syllabus), a coach might define success as running ahead (signalling) and looking and passing ahead. Whenever players demonstrate this in an activity a coach needs to 'catch them being good' (Westwood et al., 2019). Usually this would not involve stopping a session, but just commenting quickly so the player notices and understand what they did well (e.g. "Sofia… I loved how you had your head up there and passed ahead. Excellent work.") However, if a player were consistently showing success, a coach might pause a session to draw attention to that player and use them as a positive peer demonstration. A big success is worth celebrating.

Prompts, not lectures ('fly-by' coaching).

Like the point above, it is rarely necessary to stop a session for long periods to make a coaching point. Often, the best coaches and teachers can instruct 'concurrently' and keep the session flowing and the players active (Hastie, 1994). Only when players are making consistent mistakes, or when performance is so good it deserves special celebration, should we stop a session for a coaching intervention. Even then, research has shown that players tend to recall only brief and limited information[19], so long lectures and stories should be kept to a minimum.

Tactical questioning and mini discussions.

Again, in line with the session design principles (below), a core coaching behaviour in a games-based approach is tactical questioning. Research shows that questioning is a poorly developed skill in coaches, but can be improved with training and practice (O'Connor et al., 2022). There are lots of strategies for questioning, but one we have found useful as part of this approach is the 5Ps[20]:

- **Prime**: direct their attention to the chosen game problem (e.g. how do we create an advantage?)
- **Play**: play a game that is conditioned to present the problem (reminding them of the question from time to time)
- **Pose**: re-state the question and give them time to think about a response (e.g. "have 1-minute as a groups to discuss your ideas")
- **Probe**: ask for a response and then probe for depth of understanding (e.g. "can you show me what you mean? Or talk me through that a bit more…")
- **Progress**: try to find a way to connect their responses to a new question that reflects a progression to the activity (e.g. "OK, you have shown me how you'd create an advantage *with* the ball, let see if you can create an advantage *without* the ball").

Use externally focussed instructions, analogies and metaphors.

Alongside questioning approaches, it is also sometimes useful to simply offer instructions and demonstrations (e.g. when players can't find the solutions themselves or when there are known optimal approaches, for example with shooting form). When offering instructions, research has

shown that there are some effective ways to do this. We have summarised this into two main categories:

1) **External focus of attention:** once a skill has been learned to some degree (i.e. it is not completely new), instructions should guide the player to focus on things outside of their body, or towards the goal. For example, rather than saying "bend you knees and get low" you might simply say "slap the floor with your hands". Or, instead of instructing a player "get your head up", we might simply say "look at the basket" and rather than "flick your wrist" we can say "fingers in the cookie jar".

2) **Analogies and metaphors:** the last example above – fingers in the cookie jar – is a good example of a metaphor as it captures the idea of reaching up to a high shelf, with the body fully extended, to reach into a jar by flexing the wrist. A good metaphor or analogy tends to simplify an instruction and make it catchy and memorable. There is research that shows that skills taught this way – or what is known as 'implicit' learning – tend to be more robust and less likely to break down under pressure[21].

SESSION DESIGN

Arrival activities (RAMP principle).

Prior to the onset of the adolescent growth spurt (around age 12 in girls and 13 in boys, on average) children do not produce large forces and are very unlikely to experience muscular injuries as a result. It is therefore unnecessary to begin sessions with extensive dynamic flexibility warm-ups at this age, which are often perceived to be 'boring' as they typically do not involve a ball. Instead, like the English FA, we recommend simple arrival activities to welcome children to sessions with simple fun games that do not need 'coaching'. Arrival activities are simple and flexible so that children can join easily as they arrive, often at different times. It does not matter, for example, if the number of players on each team varies or if numbers are uneven at times. A coach need not lead the activity and children should be encouraged to self-officiate games. Where coaches want to take more of a formal start to a session, they should follow the RAMP principle by steadily **R**aising the heart rate, **A**ctivating target muscles, **M**obilising key joints (e.g. hips, knees and ankles for a defensive session), and **P**otentiating skills and concepts featuring in the session, getting up to game-speed.

Game > Skill Development > Game (progression).

The idea of game-based teaching and coaching, where sessions *begin* with modified game forms, has been growing in interest for 40 years[22]. The so-called 'curriculum model' developed at Loughborough University in the 1980s, contains ideas for how sessions should be conducted:

1) Begin with a simplified game form, that is representative of the game but emphasises or exaggerates a particular problem;
2) Play the game to enable appreciation of how the game works;
3) Once players understand the game, pause and use questions to explore tactical understanding (do they understand how to solve the problem?);
4) Engage in more focussed skill development activity to develop the solutions they players need to play the game;
5) Return to the game, or progress the game, to allow players to explore the application of their skills to solve problems.

There is good evidence that this approach is preferred by children because they get to play a game straight away (no more questions about "when can we play a game?"). A skilled coach

should combine intelligent game design with purposeful behaviours, such as tactical questioning (how do you succeed at this game?), to achieve the best results with this approach.

Differentiated competition to accommodate a range of abilities.

We noted earlier that competitions focussed on individual improvement can be productive and motivational. Competing is also a fundamental ingredient of sport. However, where we have groups of young people who have very different training ages – as is common in basketball – it can be very difficult to organise competition-based practice without the strongest players dominating the session. One way to avoid this is to create competition 'ladders' where players are initially separated into sub-groups, perhaps via self-selection (e.g. "get into groups with players of a similar height"), and play a game[23]. The winner of the first game goes 'up' a court, and the loser goes 'down' a court, before playing again. After a few games, the more capable players will have risen to the higher courts and the less experienced players to the lower courts. It is also possible to differentiate the task across groups. For example, after some natural ability groups emerge from the system described above, sorting a group of 12 into 3 groups of 4, the higher group could be given a more complex task to work on. It is, of course, important to continue to emphasise improvement (going up a court) over outcome (who is on the top court), and that players are constantly striving to move up from wherever they find themselves at any given point.

Systems for recognising and rewarding individual improvement.

This final design principle is about creating an environment that is focussed on individual improvement and promoting a sense of competence (see objectives, above). A coach can create systems of recognition and reward to encourage all sorts of behaviours, so this needs to be a deliberate decision. Such systems can be simple and regular, such as scoring activities in a given time, before noting improvement a second or third time. These kinds of systems can be 'scaled-up' into weekly and monthly competitions and rewards for the 'biggest improvers'. With more time and resources, improvement can be measured and tracked in simple ways, or it can simply be part of the language a coach is using on a session-to-session basis (e.g. picking out someone who has made a big jump to demonstrate to other players – "Alex has made a big improvement in her defensive stance today, let's take a look at what she's doing").

Notes

[1] The idea of Constructive Alignment was developed by Australian professor of education, Dr John Biggs. It was adapted and applied to coaching by Dr Bob Muir in the form of the Coach Planning and Practice Reflective Framework.

[2] Dr Bob Muir gave an interview on a UK Coaching podcast recently about the development of the CPPRF, which can be accessed here: https://www.ukcoaching.org/resources/topics/podcasts/a-journey-as-a-coach-developer

[3] A recent study led by Professor Sergio Lara-Bercial explored factors underpinning dropout from sport across 6 European countries. The two biggest factors were lack of social support and lack of motivation, both of which can be heavily influenced by coaches.

[4] This is the most consistent finding about enjoyment in the research (Lara-Bercial et al., 2018) and has been found to be the case at least since the 1980s when research on this subject began (Wankel & Kreisel, 1985).

[5] According to motivation researchers, there are three basic psychological needs that must be met for someone to feel motivated to do something: 1) competence; 2) autonomy; and 3) relatedness (Vansteenkistie et al., 2020).

[6] The psychologist Erik Erikson developed his staged theory of psycho-social development in the 1950s. In school-aged children he suggested it was critically important for teachers and parents to set realistic expectations and praise accomplishments for children to develop a sense of competence. Without this, they would instead develop a sense of inferiority and the belief that they no good and could not become good at a subject.

[7] There is a growing body of research that argues a coach's role in team sports is to support players to develop what coaching scientists call: 1) 'knowledge-of' the game (rules, strategies), 2) 'knowledge-in' the game (individual tactics e.g. how to get a shot away against this defender), and 3) 'actions-for' the game (the skills and physical capabilities required to apply the 'knowledge-in' e.g. a pull-up jump shot, supported by deceleration and jumping capability) (Ashford et al., 2020).

[8] The legendary American youth sport researchers, Ronald Smith and Frank Smoll, are well-known for their research on motivation. A central insight from their work is that coaches can create task-focussed and mastery environments – where they emphasise skill development over winning – in order to maintain motivation and engagement in the game. Players in their research typically report that they prefer these kinds of coaches (over those that emphasise winning) and suggest they want to return to play for these coaches the following season (Cumming et al., 2007).

[9] A recent academic review compared a range of studies that manipulated goal types with a range of athletes (Williamson et al., 2022). It found that outcomes goals were largely demotivating and that process goals were much more effective.

[10] There are a number of studies that measure Active Learning Time in PE (e.g. Roberts & Fairclough, 2011) and the range of ALT varies greatly. However, we have yet to see any studies where ALT is consistently over 50%, to the FA's target of 70% is likely very ambitious.

[11] In a landmark study comparing the practice histories of U16 'elite' soccer players in eight countries, Ford and colleagues found that, by age 16, most players selected as professionals had accumulated an average of between 4,000-5,000 total practice hours (Ford et al., 2012).

[12] A recent paper on player learning and development, rooted in football, offers a framework for task design for coaches (O'Sullivan et al., 2021). The four main types of information involved in the task – the ball, direction, opposition and consequences – help to shape learners' attention and intention in the right way, ensuring that all skills involved in the task are relevant to getting better at the game. Too often we walk onto basketball courts around the UK and many, if not all, of these core types of information are missing from the drills and activities we see. Whilst it may not always be possible to have all four types of information present, we would argue that the more the better!

[13] There is a large body of research on the role of 'challenge' in the learning process. One framework that has become popular in sport is the 'challenge point framework' which suggests that optimal learning occurs when novel challenges (or game problems) are presented at a level that matches or just exceeds a player's current level of skill (Hodges & Lohse, 2022).

[14] Grouping to achieve differentiation in diverse groups is common practice in secondary PE and researchers have offered some practical ideas on how achieve this while remaining sensitive and flexible (Jarvis et al., 2017).

[15] Bruner's big idea was developed in response to the US government's desire to beat the USSR in the 'space race' and the demand to develop world-leading scientists (Bruner, 1960). The idea of the spiral

curriculum has been applied widely across a range of subjects and was introduced into sport education by Len Almond, who adapted the idea to games teaching in the 1980s via the 'Teaching Games for Understanding' movement (Harvey et al., 2018). The application if this idea, along with the complementary concept of 'interleaving' is explained very well in this short TEDx talk by Kristen Phillips.

[16] The idea of 'moments' that are defined by the state of the opposition, is useful for coaches since it suggests we guide players attention to the state of the opposition: are they organised or disorganised? Can we attack quickly or should be build an offence? (Tee et al., 2018). Players should be supported to slowly learn how to read an opponent, helping them to decide what moment they are in, what problem to focus on, and which tactics and skills to apply.

[17] These ideas come from a research tradition known as 'Ecological Dynamics' (Renshaw & Chow, 2018). One of the best sources of information for coaches on this approach is Professor Rob Gray's popular podcast: *The Perception-Action Podcast*. He also has an excellent website where he tried to bring these ideas down to the ground for coaches to understand and apply.

[18] This is a phrase borrowed and adapted from the great movement scientist, Nicolai Bernstein, often recognised as the founding father of movement science.

[19] Research with Portuguese academy footballers (Januario et al., 2016) showed that coaches gave on average 5 pieces of information per feedback break, using around 30 words on each point. The players only retained about 60% of the information after the session, but were better able to recall information when coaches had made fewer points (i.e. 1-2 bits of information per intervention).

[20] This is an adaptation of the 6Ps strategy offered by Harvey & Light (2015).

[21] The idea of 'implicit' learning in sport has been around for over 20 years. It is contrasted with explicit learning, which is typically what coaches do: they tell players what to do and how to do it in detail, getting them to think about their form and how they are moving. In studies that compare implicit and explicit approaches to coaching, they have found that skills learned implicitly, with the help of analogies, tend to be learned a little slower, but are retained for longer and don't break down when players are put under pressure (Poolton & Zachry, 2007).

[22] Rod Thorpe, Dave Bunker and Len Almond were colleagues at Loughborough in the 1980s and developed an approach to teaching games that became known as Teaching Games for Understanding (TGfU). There are well over 300 scientific studies published now that demonstrate the value of this approach over traditional approaches that feature high levels of technical work before playing games. In a recent academic review (Kinnerk et al., 2018), games-based approaches were found to be much better for the development of tactical understanding in team sports, and equal to traditional approaches in developing technical capability.

[23] There is a useful study by Jarvis et al. (2017) where they explain the value of grouping for differentiation and offer a range of ideas for doing this coupled with the implications of each. The example we offered is one we use effectively on a regular basis, along with simpler methods like grouping based on height, or simply by creating flexible groups based on playing experience (always with the idea that groups can be revised regularly).