DEALING WITH COMPLEXITY IN CONCEPTUALISING COACHING IN TEAM SPORTS

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Introduction

Sports coaching is a complex, dynamic, multi-variable process that is made more challenging for coaches of team sports. The purpose of this paper is to identify a number of the strategies that coaches adopt to enable them to deal more effectively and efficiently with this challenge. Although sports coaching can be conceptualised as a generic process, there is no doubt that the implementation of the process is shaped by many factors, including the demands of specific sports and their many levels, contexts, roles, intensities, competition structures, and performance components. One of the particular characteristics of sport is its individual/team arrangement, and the paper will demonstrate how this factor brings additional complexities to the coach's practice.

The nature of the coaching process is examined briefly, and followed by the distinguishing features of the team sport coaching environment and their impact on a number of key functions within the coaching process. Despite these challenges, it is clear that team sport coaches must and do cope with them. The paper goes on to examine three of these strategies: reducing complexity by the use of monitoring thresholds and key catalysts; adopting pragmatic planning strategies; and using 'models' of performance to manage expectations. These strategies are inter-related, as one might expect given the seemingly coordinated and integrated nature of expert coaching behaviour. The paper concludes with a brief examination of the implications for the development of expertise in coaching.

The coaching process

Sports coaching may be conceptualised in a generic way as a process in which the coach designs, manages and implements a more or less comprehensive programme designed to improve performance, normally toward a particular set of personal and organisational goals. The programme includes recruitment, preparation and competition elements, and embraces both formal and informal activities and interventions. Sport is a social and cultural phenomenon and sports coaching deals with a particular mix of person and performance components that are mutually dependent. The coaching environment within which the coach operates has an enormous range of commitments and intensities, of public and organisational accountabilities, and of deployment characteristics (full- or part-time, voluntary or professional, individual or coaching team).

Thus the coach's practice will be influenced by a whole series of contextual or environmental factors. Coaches' practice will be impacted significantly by being within particular coaching domains - recreational, participation, development, performance, or elite (Lyle, 2002; Trudel & Gilbert, 2006). It will also be shaped by the level of performance, the athletes' expectations and commitments, the organisational context, goals and resources, and the extent and sophistication of the intervention programme. There is a symbiosis between the sporting context, with its reward environment, and the consequent performance climate, with its commitments and demands, that can be expected. There are also a number of factors specific to the coach, that is, his/her personal values and philosophy, and experience and expertise. The coaches' role within the sport, particularly in competition, will also play a

significant part of shaping their behaviour and practice. The many elements of the coaching process come together in a number of coaching domains, that is, distinctive sporting milieus in which the environmental demands lead to a more or less coherent community of coaching practice, with its attendant demands on the coach's expertise and practice. It is the performance domain that provides the backdrop to this paper. This domain is characterised by intensive commitment, attention to individual performance components, control of lifestyle variables, emphasis on performance outcomes, and monitoring and evaluation

It is accepted that the coach's intervention programme is likely to be more successful if it is integrated and coherent, and has the characteristics of a systematic approach to all of the contributory elements that impact on performance development. However, this is not a simple exercise. There are many features of the coaching environment that are problematic. For example, performance improvements themselves are enhanced by sports science support and the intervention programmes are devised within sports science and training theory principles. Nevertheless, design and implementation appear to owe as much to experience and traditional practice as they do to systematic rigour. Sports coaching is also a contested activity in the sense that the achievement of performance outcomes is actively opposed by other coaches and performers. Furthermore, coaching is an extended period of social activity. Not only will the motives, emotions, ambitions and self-esteem of the performer be constant filters, but the vagaries of the interpersonal relationship between the coach and performers will pervade training, competition and, indeed, the whole coaching process.

Recent literature concurs that there has been a significant underdevelopment in the state of knowledge and theory building related to sports coaching (Abraham, Collins & Martindale, 2006; Cushion, Armour & Jones, 2006; Gilbert, Côté & Mallett, 2006). However, part of more recent advances has been an emerging conceptualisation of the coaching process that emphasises its dynamic and untidy nature. Indeed, it is often described as 'messy' and complex, and with an unresolvable mix of multiple goals and achievements (Bowes & Jones, 2006; Jones & Wallace, 2005). A particular focus for attention is the socio-pedagogy of intervention strategies. The implication is that coaches and performers have to cope constantly with such a range of challenging factors that the coaching process is not easily susceptible to description or analysis as a systematic, rational process. Coaches deal with this complexity in an incremental and contingent fashion, a competence that has been described as 'orchestration' (Jones & Wallace, 2005). This approach to conceptualising coaching is one that has considerable resonance for coaches of team sports.

Coaching in team sports

Team sports present a number of particular challenges that impact all facets of the coaching process. These are partly caused by the number of performers involved, but also by the competition structure and the coach's role in the game itself. It is also the case that team games can generally be described as interactive, open skills-based, and with active opposition. The variable nature of the performance, with its varying balance of performance components (technique, tactical, physical, psychological, and so on) presents a considerable challenge for preparation and capacity building. The particular features of team sports that influence the coaching process are as follows:

- Team sport personnel may change quite significantly from season to season, and within seasons.
- Teams are normally composed of players who are at different stages of maturity, experience and development (and with different contributions to overall effectiveness).
- There is an extended competition period. This is often subject to unpredictable scheduling.

- The preparation phase is shorter than in 'target phase' sports, and the 'value' (or points) accorded to success is constant throughout the season.
- Success is normally measured in 'relative' rather than 'absolute' terms, that is, dependent on winning against the opposition rather than dependent on the quality of the performance.
- Games are often impact and interactive in nature, and many sports are characterised by short or long-term injury disruption. Many team sports are also influenced by environmental conditions.
- It is generally the case that team game sports require a greater number of players to be available than are required in the game at any one time. This produces team selection issues.
- There can be a challenging number of coach-player personal relationships to be managed, and a large number of player-player inter-relationships. These have the potential to provide stability and a positive climate within the team. There is also potential for disruptive relationships, sometimes occasioned by selection, status, or esteem issues.
- Teams goals have to be set beside a range of individual ambitions. The extended competition period may also result in the potential level of success and achievement becoming evident before the competition period is over. One of the challenges to arise from this is the need to accommodate to changing goals as the season unfolds.
- The extended competition period may be problematic for phasing or periodising within the season. The central issue here is that of maintaining appropriate levels of intensity, while achieving progression, recuperation, or rehabilitation.
- Teams are generally made up of different specialist positions. This impacts on individualisation, performance component balancing, managing workloads and interventions, and recruitment and selection.
- In many team sports there is a role for the coach in managing the performance during the game. This is a distinctive competence, and may create a set of psychological and emotional demands (in addition to strategic and tactical decision making) similar to those experienced by performers.

These team sport characteristics impact on the coaching process, both the process boundaries (Lyle, 2002) and aspects of the coach's practice. The potential lack of continuity of personnel has an impact on social and tactical cohesion, and projecting longer-term goals. Frequency and duration of preparation is not an issue if the team is full-time, but otherwise the need to prepare both the team and the individuals can be problematic. The aggregation of stages of development and individual goals in the context of often dynamic team goals provides a challenge to the coach. Planning, and implementation, for team sports is particularly challenging. The very complex interaction of performance components and the need to individualise these, when combined with the extended competition season, makes workload management a demanding task. The need to integrate short and longer-term targets is strongly influenced by the immediacy of the next game. When taken in concert these factors can combine with differential resources to make it difficult to demonstrate, or evaluate, the coach's effectiveness.

The paper now goes on to examine in greater detail how the coach in team sports deals with some of the complexity that has been identified above.

Reducing complexity

The key issue for team sport is dealing with the scale of the detailed decision making that is implied by a rigorous and systematic attention to the intervention programme. As indicated previously, this is partly a function of the number of performers, their individual needs, and the integrated nature of game skills. There are also contributory factors from team sport coaching: a focus on the duration of drills rather than volume, the problem of monitoring

progress in complex skills, inherent variability in the quality of opposition, the time cost involved in monitoring on a continuous basis, and the challenge of focusing on improvements in fundamental skills, when short-term preparation is often a priority. The overall approach of the coach is to manage uncertainty and retain control within the dynamics of the situation. This means acting optimally in terms of data gathering, predicting/anticipating/assuming, and having solutions/responses to hand. For the expert coach, experience has been converted into a capacity for decision making. The question is how?

The solutions adopted by coaches will not be surprising to experienced coaches, but the issue is whether or not they have been acknowledged as coaching competences and incorporated into coach education. Coaches work to a framework of thresholds in monitoring progress and feedback, and they apply these 'triggers' to priority 'markers' of performance. Coaches use these shortcuts to make sense of, and manage, the huge scale of data with which they are faced, particularly, as we have described above, for the team sport coach. This allows the coach to maintain the programme without the constant change that could be very unsettling. Thus there is a reduced need for change, there is stability in the coaching process, and coaches do not have to depend on performance outcomes to evaluate progress. This capacity to operate to thresholds and triggers is dependent on experience and the building of knowledge structures. It contributes to the picture of the coach as operating intuitively and reinforces the need to emphasise cognitive expertise in coaching education (Lyle, 1992; Cote et al, 1995; Salmela, 1995; Abraham & Collins, 1998; Saury & Durand, 1998; Gilbert et al, 1999; Lyle, 2002).

Coaches will try not to make a constant stream of judgements. They operate by recognising patterns of progression/player reaction/ outcomes/momentum/response and so on that they have experienced previously. This has been assimilated and has been converted into 'working knowledge'. The coach's 'working knowledge' is significantly under-researched and does not appear to form part of formal coach education. Decision making (including deciding not to take action!) is triggered by the recognition of a pattern of behaviour or circumstances. This is matched with a 'catalogue' of problem patterns and an action decision may follow. This cognitive capacity, in which the coach does not compute every possible decision but 'settles on' an emerging decision, is best explained by recourse to the Naturalistic Decision Making paradigm in psychology, and this should form an active theme in coaching research (see Lipshitz et al 2001). NDM is concerned to understand and explain "how people make decisions in real-world contexts that are meaningful and familiar to them" (Lipshitz et al 2001:332). The focus of such research is on proficient decision makers – individuals who have relevant experience and knowledge in the decision-making domain. Since the emphasis is very much on situations characterised by uncertainty, uniqueness, complexity, goal conflict and time constraints, the 'match coaching' context of team sport is an appropriate area for investigation, as is crisis management of training programmes, and interpersonal interaction.

The coach builds up knowledge structures with attendant variation and resultant actions. The triggers themselves need to be established for a range of contexts in all sports (although some will be general) – again, research is required. In volleyball research carried out by the author (Lyle 2003), the competition triggers were target scores, momentum changes, loss of playing rhythm, loss of mental composure, and clusters of points. These led to action decisions such as substitutions, time outs or tactical changes. Researchers within each sport need to identify these triggers, particularly in training. The threshold values (the point at which the coach decides that action is required) are likely to be very individual, and very context dependent. Nevertheless, there may be some principles that can be established through education or mentoring with more experienced coaches. In work carried out by the author, the threshold values appeared to be higher than expected, that is, coaches were willing to live with considerable variation (Lyle, 1992).

Pattern recognition is extremely important, whether in training sessions or competition. Early and accurate situational analysis reduces the options required. This is not an easy task. The familiar list of factors – dynamic, complex, contested, human reaction etc. – make 'reading the game' or 'understanding the players' a difficult task. Deconstructing and reconstructing these complicated pictures may also be a mark of the expert (Chi 1988, Siedentop and Eldar 1989, Berliner 1994).

For the team sport coach there is a need to coordinate, integrate or orchestrate the coaching process. This is a set of skills that we recognise in expert coaches. Part of this expertise is managing a 'busy' environment; relieving the complexity and thereby maintaining control over the coaching process. Thresholds allow more continuity and stability in the training programme. Working with key 'markers' of performance allow change in these to be a more consistent focus for development alongside the considerable variation that is inherent in team sport performance, and provide a basis for monitoring and evaluation.

Using mental models

The previous section identified how coaches reduce the inherent complexity in the coaching process. The question remains of how the coach creates and manages the framework of expectations within which the coach and players operate. This section describes an exploratory account of the team sport coach's use of mental models (Cote et al, 1995; Verchoshanskij, 1999; Lyle, 2002; Abraham et al, 2006). Mental models are a series of 'frames' or virtual images that are used to filter cognitions, particularly decision making. The coach operates by matching (comparing, contrasting, recognising discontinuities, predicting) events against this framework of expectations. The mental model can be described as a dynamic framework of knowledge, relationships, expectations, predictions, causes and effects, and scenarios. These models are sport- and context-specific, and may be more or less sophisticated and detailed. One argument might be that the coach would find it difficult to be prepared for all eventualities, but the models help to filter incoming information and provide a constant comparison.

There are three sets of models: a goal model, performance model, and simulation model. The simulation model can be usefully further divided into development, training, and match coaching models. The goal model is an integration of the team's outcomes goals and the planning process. As has already been stated, team sport goals are often subject to change as the season progresses, and this is partly the function of the model. The model has a mix of subsidiary targets and progression points, and it is the achievement or non-achievement of these that triggers a re-assessment of major goals. The goal model is important as it provides a strategic framework for the coaching process. There is no strong evidence of how the goal model is used. Experience tells us that major outcome goals may be recorded, along with targets, but the detailed calculations of progress along with the 'what … if' scenarios are part of that tacit coaching expertise that is difficult to access. Anecdotally, there is a strong relationship between goal calculations and the training and competition programme, and there is a need to explore further the coach's use of a goal model.

The performance model identifies what is required by the performers and the team to be successful in achieving their goals. These expectations may again be held tacitly by coaches as a result of experience, but may also be more explicit and supported by analyses of performance and player profiles at the desired level. These 'requirements' are then modelled, that is, compared to current statuses, converted into targets, anticipated development stages, and perhaps most importantly, the implications for component (technique, physical, tactical, psychological) development that will form the basis of the planning/training process. The performance model also identifies timescales and has implications for recruitment and resources. It is, therefore, closely related to the goal model. The performance model is most evident in the coach's planning, and much of this will be recorded and accessible. However,

the coach's management of expectations, progression thresholds and triggers, and evaluations once again forms part of that unexplored expertise that characterises the effective coach. The complexities of the team sport context, with its multi-goal, multi-variable performance, and mix of positions, ages, stages, and so on, merely reinforces the challenge for the team sport coach.

The simulation models are more varied in character, but are best described in terms of the day-to-day management of training and competition. Once again it is necessary to recall the potential number of action decisions faced by the coach in managing the complex team sport coaching process. Simulation models help to reduce that burden. They consist of 'scripts', that is, scenarios or stories that anticipate future events, based on past experience and the events to date. In simpler language, coaches have an image of what is likely to happen because they have experienced many similar situations previously. This is not a wide range of expectations (such as the novice coach might face), because experience has shortened the possibilities (in the jargon, 'hypothesis narrowing'). The coach is able to 'think forward', termed anticipatory reflection, and therefore has a bank of solutions or next steps available. Remember that the threshold mechanism means that much of the time the coach is not involved in crisis decision making. The simulation model will have incorporated the inherent variability in performance and training response. Perhaps key to the coaches' expertise is that the simulation model has built into it the solutions to the problems that may arise if the actual events do not match expectations. Match coaching is a specific example of the simulation model in action. The experienced coach manages the 'unfolding' competition by constant comparison to the specific model created for the game. This is particularly helpful where non-deliberative decision making is required.

With these models, expert coaches can engage in pre-emptive and preventative action because of the accuracy and speed of their situational analysis. Novice coaches may need to engage in more 'remedial' activity. The expert coach will also be more accurate with the 'assumptive reasoning' required to infer the forward behaviour of performers or opposition performers or coaches. The coach's behaviour will appear intuitive, that is, largely without deliberation, because the action decisions have been (if all goes well) anticipated or have been recognised fairly quickly and matched to the script and solution. The behaviour will also seem to be routine because the action decision is only necessary when a threshold is breached, and solutions to problems have already been converted into accessible solutions and 'indexed'.

It will be obvious that these models are inter-dependent and are constantly updated. Although the coach's experience is derived from many different situations, the models are context-specific. It is difficult to imagine how they could be other than tacit, although this also renders them relatively inaccessible, and contributes to an uncertainty over coaching expertise. As the term 'mental models' implies, they form part of that set of cognitive skills that form coping strategies and contribute significantly to the orchestration or meta-coordination of the coaching process.

Planning

Planning involves predetermining the most appropriate preparation and competition programme to achieve goals. The purpose of this short section is not to deal with all of the issues in the planning process, but merely to emphasise the tactics adopted by coaches in facilitating a manageable planning process. The content is based on the lessons to emerge from conducting a coach education module on planning with experienced team sport coaches. Representative team sports operate within a different competition structure to club teams, and their planning may be susceptible to greater pre-determination, although with continuing issues of changing personnel.

The issues relevant to the coaching process are those identified previously: specialist positions, multiple goals, uncertainty in the competition schedule, variable opposition, integrating club and representative programmes, and players at different stages of development. Coaches also acknowledged the highly variable environment – issues of facilities, weather, and player availability. Perhaps the key issue was the challenge of maintaining a focus on the longer-term goals and performance model in the context of the immediacy of the next competition. One quote illustrates this dilemma, "Last week's performance, plus last week's results, plus long term goals, equals the weekly plan. … The process of adding in the long term plan to the weekly plan is the most important point I would stress … ." A second important challenge is that of maintaining a high level of intensity in preparation and competition over an extended period of time. The need for an element of regeneration and variety is reflected in attempts to periodise within the competition period.

The coaches reported a number of features of their planning practice designed to make it manageable. In general they resorted to what might be termed 'recipe' planning, that is, using content they had used previously in similar situations. It was rare to resort to 'first principles' unless dealing with an unfamiliar situation or a crisis. Although there was a desire to work systematically, there was a high level of contingency in the implementation of the programme. This resulted from recent performances, player condition and availability, goal reassessment, and environmental conditions. The coaches recognised that an over-emphasis on short-term contingency threatened to lose the benefits of an integrated, aggregated process. On the other hand, coaches almost always operated with key performance indicators. These provided some stability to the programme and to monitoring and evaluation.

There was considerable variety in how coaches dealt with the determination of detailed weekly or sessional plans from the overall cyclical principles. The competition programme was used to provide an 'umbrella' plan, and major cycles were identified. However, detailed planning was rare beyond relatively short cycles. The range varied from those who used one week as the planning unit to those who relied more heavily on 4-6 week plans. There was some evidence of a pattern that showed a more periodised physical conditioning plan, with a more contingent technical/tactical preparation. Franks et al's (1986) model for linking sessional plans within an incremental improvement and balance of general and specific preparation, and Rushall's (1992) suggestion of alternate physical and skill mesocycles may be helpful.

Summary

There is no doubt that team sports provide a specific and challenging context for the design, implementation and management of the coaching process. This short paper has attempted to demonstrate that coaches use a number of coping strategies to reduce the complexity involved. What immediately becomes evident is that team sports magnify the need for a meta-coordination or orchestration of the coaching process. The coping strategies have been shown to be cognitive mechanisms for assisting decision making and planning. These would become evident in the intervention programme, competition management, and inter-personal relationships.

Coaching in team sports has often been characterised as intuitive in nature, with a significant element of experience rather than education required. This description has failed to capture the essence of the coach's expertise or how it has been developed. The mechanisms described above reinforce the emerging consensus that coaching expertise, whilst reliant on craft skills to manage the intervention programme and player relationships, is essentially cognitive. Furthermore, these cognitive skills operate by creating a very complex and detailed structure of sport specific, context specific information, relationships, causes and effects, expectations, predictions, problems and solutions that cannot easily be recorded or

communicated. More significantly, the actual mechanisms through which coaches make decisions and judgements, and manipulate the information can be modelled but is difficult to confirm empirically.

Sports coaching is a higher-order expertise, essentially cognitive, but much under-researched and ill-defined. Team sports provide a valuable context within which this expertise finds expression, and in which advances could be made in research and education.

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