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How would you recognise an expert coach if you saw one?

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Would you recognise an Expert Coach; if you saw one?

Abstract

A review of the literature that frames coaching practice and specifically the formation and determination of expert coaching practice reveals a body of research that lacks continuity. It has recently been argued that much of the instability surrounding our professional interpretation of coaching practice stems from a penchant for subjective investigation. This analysis draws on a review of over 100 peer reviewed articles, chapters and books – all published within the last 35 years, that address the notion of coaching practice. The findings of this analysis suggests that much of the research used to establish conceptual clarity fails to distinguish between highly organised or efficient coaching practice and expert coaching practice. This paper concludes with some recommendations from alternate paradigms which suggest that expertise in interceptive sports coaching may be better theorised and suitably identified through a lens of the growing ideas surrounding ‘emergence’.

A short story

At a recent junior age group football (soccer) game a coach was plying his trade with a group of players who were taking their first steps onto a full size field, with a full quota of players. It was amazing to watch how, with the consummate ease, and apparent success, this relatively anonymous football coach went about his business. In what to some might be perceived as an unenviable task, this voluntary coaching practitioner developed a solid and deep understanding of the roles and responsibilities of the positions associated with a three, five, two field formation. Further, as if to punctuate his coaching prowess he achieved this higher order understanding by simultaneously reinforcing the abstract concepts of field position and possession. After the session and on the drive home, the first author was compelled to quiz the young player / passenger beside him (his

son) about his roles and responsibilities as a right-winger and left defender – both the positions in which he had trained. It was enlightening and altogether unexpected to listen to the depth and breadth of understanding inherent in the lad's descriptions that clearly connected to his engagement in the previous learning episodes. This experience alone provided the impetus for the search for a deeper understanding and a serious reconsideration of the descriptors and parameters of 'expertise' in sports coaching and furthermore whether or not these can be put into service, to cultivate or indeed confirm expertise. At the same time a further and somewhat more foreboding question emerged: were we stifling the distribution of knowledge and expert practices in sports coaching? This paper is drawn from a large and lengthy study and as such it represents part of that search for understanding

Introduction

The study of expertise has long been a challenge for academic research across a range of disciplines and more recently this includes disciplines and sub-disciplines associated with sport [1]. From the fields of cognitive and behavioural psychology, the concepts of expertise and the acquisition of expert knowledge have intrigued researchers concerned with the noticeable disparity between individual levels of human task performance and individual rates of skill acquisition to perform those tasks. This perceptible imbalance among human beings for acquiring complex skills indicates a variable aptitude for the encoding, storing and recalling of complex skills. It is this diversity that has provided a serviceable cornerstone for a research focus addressing optimal levels of human performance, and more recently, research targeting intervention and facilitation mechanisms that are designed to enhance the acquisition of expertise. This scenario has a long and rich tradition in sport, and while studies that concern enhanced skill acquisition (particularly in industrial settings) have been conducted since the turn of the twentieth century [2-3], the notion of expert performance in a sporting context is more recent and perhaps remained largely untouched until the involvement of cognitive psychology in the 1970s.

Abraham, Collins and Martindale [4] suggest that professional inquiry regarding expertise in sport has only reached prominence in the last thirty-five years. Furthermore, expertise in coaching as an off-shoot of the expert sports performance

paradigm has much more recently attracted the necessary academic interest that it warrants. However, a new research vein targeting the analysis of abstract notions such as mental constructs [5-7], and the coupling of perception with action and the decision making process has ensured that the notion of expertise in a sporting contexts generally and sports coaching specifically, has received significant attention of late [see 4, 6, 8].

Our intentions in this paper are to briefly review how 'expertise' is broadly understood in sport generally and at the same time identify the research trends that have led to this understanding. We then connect these trends to coaching research in order to offer a potential way to explore some possibilities related to how coaching expertise might be recognised and in doing so identify what sort of questions might be worth asking related to the acquisition of coaching expertise.

Research Trends in Sports and Coaching Expertise

In light of the relatively short time span defining the examination of expertise in sport, four distinct research phases can be identified as having contributed to our current understanding of expertise in sporting and coaching contexts. The first of these phases occurred prior to the 1960s, a period generally dominated by behavioural psychologists prosecuting the notion of 'motor behaviour' theory [9]. This research phase advocated an information processing model that explained expertise as a tangible reduction in the time taken to complete a stimulus – response selection task (reaction time) and or a stimulus – response initiation task (movement time) generally grouped together as inputs and outputs. Drawn primarily from the world of industrial task performance, particularly but not exclusively in manufacturing and in office related work, research studies within this field involved calculating the time expired in completing vocational skills such as box making, assembly line tasks, telegraphing and typing. It was inferred that meanings extrapolated from the research of vocational skills could provide some insight into better understanding the acquisition of expertise in the realm of sports performance.

The impetus for the second phase of research targeting expert performance in sport stems from a professional concern by experimental psychologists regarding the capacity of the information processing model to cope with the sheer volume of possible motor functions, patterns and skills a human might be required to remember. Hodge, Starkes and MacMahon [10] suggest that much of the research that examined

the role and contribution of such models on sporting expertise of the 1970s relied on experimental psychologists and cognitive psychology. Typical research of this period involved models and schemas such as Adam's closed loop theory [9], Schmidt's schema theory [9] as well as Ericsson and Smith's Expert Performance Approach [13, 14] as a mechanism for comparing the performances of skilled athletes with less skilled athletes (novices). Research of this period was domain specific and generally involved the recall and recognition of information gathered through the senses but necessarily dominated by visual input. A primary research objective that characterises this phase of research was a preoccupation with knowledge structures – as a means of determining if such a concept could be used as a parameter for determining expertise.

A further phase of the research agenda defining expert performance in sport is characterised by the introduction of equipment capable of tracking and recording eye movements. Vickers [15] suggests that technological developments have contributed towards the consolidation of a perceptual-cognitive research agenda. Technological developments in recording equipment have enabled researchers to analyse data that derives from a linking of retinal movement patterns with verbal-response recordings. Similar to the preceding research phase, this chapter of research was driven by a focus for determining the differences between expert and novice performers within specific sport domains. However, just like the preceding phase, this research period was subsequently hampered by professional contention regarding the parameters used for identifying and selecting domain specific experts to be studied. Chi [16] most pertinently supports such a stance by declaring research of this period was preoccupied by the 'absolute' and 'relative paradigms' used for determining expertise. However, in spite of concerns regarding the location of expertise, this period of research is strongly attributed with giving rise to subsidiary notions such as 'deliberate practice' [17].

The most recent, still evolving, and perhaps most compelling field of research to examine and analyse the notion of expertise in a sporting context is an amalgamation of methodologies and concepts drawn from Ecological Psychology [18] and similar derivatives of dynamic systems theory (DST) [9, 19]. Hodge, Starkes and MacMahon [10] support this position by suggesting the recent emergence of associated techniques from alternative paradigms (such as ecological psychology and DST) have added considerably to our understanding of influential performances in sport. A major advantage associated with such paradigms is that they view perception

and action as a coupled response to task instability rather than separate entities. Ecological Psychologists suggest that highly skilled movements are the product of an individual's ability to initiate the appropriate movement response to a changing task. Researchers in this field describe the product of this perception action coupling process as emergent actions – allowing the action to emerge from the field rather than a premeditated and pre-organised movement stored somewhere in the central nervous system. This notion of emergent actions evolving from a perception-action exchange is the first indication of research that simultaneously recognises the interaction of both perception and action and acknowledges that highly skilled sports performance occurs when athletes/sports people are highly attuned to their environments. A most interesting feature of this ecological perspective is the suggestion that perception is not only a determining component of sports performance but also one that can be trained. The proximity of this position to the developing discourse surrounding complexity thinking is not hard to detect. Though there are genealogical differences the connections between ecological psychology and complexity thinking are best considered through the idea of adaptation. It is a position taken up by Rossi and Carroll (20) who drawing on a range of intellectual traditions, argue that intelligent performers might be best defined by their capacity to adapt to rapidly changing environmental conditions rather than any analytical function after the fact. In other words 'in the moment' decision-making (21) may be a better way to categorise 'expertise' than post event articulations of strategy, or intent. Rossi and Carroll (20) point to a range of both empirical and philosophical work that suggests the affordances or to use Popper's (22) term propensities within any given context (the constraints that define the context and the possible scenarios that might arise) are in a high state of volatility. However, Todd and Gigenrenzer (23) regard such constraints as liberating since, as they suggest, decisions for action 'emerge' from the "the joint effect of two interlocking components: the internal limitations of the (human) mind, and the structure of the external environments in which the mind operates" (p. 148). In other words Todd and Gigenrenzer argue that in order to make good decisions we should let the world do some of the work. This ecological approach relies on Simon's idea that humans tend to draw on approximate methods to undertake most tasks but also search for more information within ever changing contexts. Given the nature of the rate of change within systems, the internal heuristic device humans draw upon need to be fast. Hence heuristics need to be matched to particular environments to

facilitate adaptive decisions. These central ideas of Todd and Gigenrenzer have appeal since at first glance at least they suggest how the uncertainty within complex systems can be accommodated and how actions and decisions within evolving environments (such as a game) can be facilitated. As Jones (24) suggests:

People never make decisions in isolation. They interact with others, who themselves have decision strategies. They must modify their goals in light of the social milieu in which they find themselves. Indeed, some analysts have argued that preferences should be viewed as fluid, not fixed, because of the necessity to be flexible in the face of changing circumstances. (p. 308)

If we accept that our lives and the systems in which they function (sport being among them) are guided as much by uncertainty as they are certainty then the idea of ‘emergence’ of phenomenon (that induce emergent of naturalistic decision making), as being bound up in fluctuating propensities of systems seems reasonable. This in turn requires us to accept the possibility at least that systems self-organize around the propensities within the system itself. This further suggests that when this principle is applied to say sports coaching, linearity in decisions making not only seems unlikely, it seems untenable. Since sport (regardless of what sport) is a dynamic structure where environmental stability is unlikely, it is structured by uncertainty rather than certainty. This in turn at least forces us to consider that many sports are structured around instability rather than stability. This means that there are a large number of propensities within the system, some of which will happen and some of which will not. A linear (predictable) set of decisions to a coaching problem is unlikely to be successful. However being able to adapt allows a greater possibility of success. The key then is being able draw on fast feedback systems and frames of reference that allow an image of possible outcomes.

It is clear then at this point that an appealing conjuncture with coaching expertise starts to appear. The unifying aspect of this specialist research agenda is the consideration that through a greater understanding of how it is that an expert produces and reproduces a desirable behaviour, educators would be better positioned to elicit similar behaviours in less experienced practitioners. This might seem overly simplistic not to mention optimistic and some academics and coaching practitioners

are inclined to disagree with the initial premise that coaching practitioners can be trained to achieve the higher echelons of expertise. For example Klein and Hoffman [25] suggest that as tempting as the idea of fast-tracking expertise is, there isn't yet a tangible case to support such a possibility, especially with regards to decision making. This perspective offered by Klein and Hoffman is perhaps strengthened when one considers the analysis of expertise in interceptive¹ sport coaching. This research area is populated with published generalisations that ambiguously describe the practices of expert practitioners as 'maxims of practice' [8], 'tacit knowledge structures' [26, 27] and 'experiential knowledge development' [28, 29, 30]. As a consequence there remains academic and professional belief that expertise is best developed through years of experience. However, while congruent research to the Klein and Hoffman (25) perspective is ample, it would be naïve to suggest that experience alone equates to expertise or that appropriately constructed coach education programs could not enhance the opportunity to acquire, develop or display attributes that define expert coaching behaviour.

Position Outline

While acknowledging the thoughts of Klein and Hoffman (25), it is the position of this paper that much of the academic argument that aligns with the 'expertise as the consequence of experiential knowledge' perspective is restrained by the limits of research design. While recognising the role that both behavioural and cognitive psychology have played in the development of our understanding of expertise in coaching, this paper suggests that in terms of 'interceptive games' [10] many of the existing research conclusions regarding expert coaching practice have unintentionally distorted the criteria used by the coaching profession to distinguish between highly organised coaches and expert coaching 'practice'. We would argue that much of the research in this area has tended to settle for exemplars of organisation and efficiency as indicators of expertise in interceptive sport coaching. The current research agenda has served its purpose in developing a comprehensive understanding of the structured tasks associated with efficient coaching practices; however, expertise is a complex concept and one that certainly exceeds the indicators of efficiency. Hence we are

¹ Interceptive sports are those that involve two opposing teams of interacting players.

convinced that expertise in interceptive sport coaching could be better theorised and more suitably identified through a lens of the growing ideas surrounding ‘emergence’.

Again acknowledging the seminal findings of early research that examines coaching expertise, it is the position of this paper that much of these earlier research endeavours have been limited in either locating or establishing a suite of key performance indicators for expertise in coaching practice. Werthner and Trudel [31] suggest as much in their declaration that determining quality remains a central issue hindering our professional understanding of expertise in coaching practice. Lyle [28] suggests that an academic propensity for conflation has resulted in a body of research that has tried to locate expertise by comparing coaching practice with other well-established domain specific fields of knowledge. As a consequence, it is argued that our current understanding of coaching practice – particularly at the high performance end, is incomplete as the dominate research frameworks that shape our current understandings are grounded in unrelated, isolated and fragmented interpretations of a complex process.

Rather than struggle for lucidity in a body of research that is already limited by contentious claims to conceptual clarity, researchers aligned with ecological psychology (and other alternative paradigms) suggest that an alternate model for locating expertise in coaching practice is required [see 32-34]. It is the growing perspective of ecological psychology that rather than continuing to extrapolate expertise from other domain specific performance areas, expertise in interceptive sports coaching can be more effectively demonstrated by analysing a practitioner’s ability to use environmental information in concert with existing knowledge structures to inform future actions that are performed under pressure of time constraints. In light of this perspective, we take the position that expertise in coaching may be determined by an individual’s ability to receive and utilise the informational cues that furnish an emergent action or response such as a decision or a decision making process. Most interestingly and perhaps provocatively, such a perspective could potentially imply that expertise is equally capable of being located in coaching roles traditionally regarded as ‘lower’ in terms of standard and sophistication. We do not advance this position over zealously but consider it to be worthy of consideration.

Limits to organised and efficient practice as markers of coaching expertise

Theoretically, the general purpose behind the cognitive research paradigm was to identify the explicit elements of a particular behaviour pattern that constitutes an elite performance. Schmidt and Lee [9] and Feltovich, Prietula & Ericsson [35] agree, suggesting that the cognitive research agenda, perceives expertise as an individual's ability to process domain specific information. While this sectional perspective is clearly suited to explaining an individual's mastery of discrete tasks and rapid serial tasks, the same cannot be said for activities performed in contested environments and the decisions that presuppose them. Unfortunately the cognitive framework has been somewhat crudely applied to coaching. However this cognitive approach is often challenged by ecological psychologists and dynamic systems theorists, who suggest that highly complex systems like the human body and interceptive environments cannot be studied in isolation as all parts of a complex system constantly interact in intricate ways. Hence examining coaching practice through a cognitive paradigm has failed to suitably acknowledge the interplay that occurs between the various elements of a highly volatile yet interactive system.

The consequence of the dominance of the cognitive paradigm means that the practice of expert coaching is portrayed by a body of information that is an incomplete and internally disputed set of interpretations of the coaching spectrum. Potrac, Brewer, Jones, Armour and Hoff [36] support such a view by suggesting that our existing interpretations of expert coaching practices are bound to a knowledge disposition that stems from research which embraces a procedural orientation. This inclination for a procedural approach to unravelling the practice of expert coaching has evolved more by default than by choice. The 'art' of interceptive sports coaching is perceived as such a multifarious process that it made justifiable sense to reduce the 'whole' to a series isolated interventions. Consequently this demarcation of a multifarious process into a series of isolated interventions has resulted in a body of research that presents a suite of efficient coaching strategies as the traits of expertise and in the process fails to recognise that coaching is a perpetual exchange of related information [see 28].

This predisposition for promoting efficient and organised practices as examples of expertise has been the safest path for a profession that hitherto has been reluctant to accurately identify expertise in interceptive coaching in any fashion other

than physical success. Chi [16] supports such perspective by claiming that while there are several methods for identifying expertise, academic research has relied predominantly on a retrospective analysis of behaviours modelled by ineffectually identified expert coaching practitioners. This issue of retrospect aligns well with the concerns of Nash, Martindale, Collins and Martindale [1] that imply our current understanding of expertise has been stalled by the subjective nature with which researchers identify expert practitioners. Chi builds on this point by suggesting research that examines expertise has historically engaged either an absolute approach (acknowledges expertise as an innate and absolute greatness) or relative approach (acknowledges expertise by comparison with a less experienced colleague), each of which fails to apply a credible process for identifying expertise [16].

It is apparent from the literature discussed that without a thorough appreciation of coaching as an ongoing process bound in practice, it becomes exceedingly difficult to analyse, identify and develop the essential elements that potentially underpin expertise in coaching practice. It is the suggestion of this paper that past research endeavours have been exceedingly useful for identifying independent process skills that enable coaches to efficiently negotiate the boundary markers that define their coaching roles. Equally, this same body of research has provided a wealth of information that has advanced our professional understanding of general coaching principles. However this same research approach has not been able to identify practical touchstones of expert practices in coaching [37]. Further to this point, Nash et al. [1], Hodges et al. [10] and Chi [16] point out that much of our existing understanding of expertise in interceptive sport coaching stems from research that has been centred on isolated behaviours and unqualified assumptions of expertise. Therefore it is the view of this paper that existing research has often chosen inappropriate practitioners to study. Consequently it could be argued that this research offer little more than a solid understanding of process skills such as effective practice, organisational skills or communication and management strategies that have proven advantageous (albeit insufficient) traits in specific high performance environments.

Locating some potential Key Performance Indicators of Expert Coaching

If as indicated above, and the key performance indicators for expertise in coaching interceptive sports are restricted to exemplars of capricious actions such as efficient behavioural intervention, formal knowledge structures or organisational skills, then researchers may have inadvertently committed a professional disservice to many community coaches, by primarily focusing analytical attention towards the elite end of the coaching continuum. However, a research prevalence for high performance coaching environments would imply that participation and developmental coaches are either unlikely to demonstrate these arbitrary measures of expertise, or their coaching environments are too rich in variables to meet the needs of controlled research. Whatever the reasons if effective practice, communication and organisational skills are the indicators of expertise in interceptive coaching than it appears quite naïve and somewhat elitist to assume that expertise cannot be drawn from the lower ranks of the coaching spectrum.

Even from a cognitive perspective, expertise in a dynamic activity such as coaching interceptive sport requires adeptness in a wide-ranging compilation of knowledge structures [38]. This need for proficiency in multiple streams of domain specific knowledge would suggest that coaching is dissimilar to many other well researched domains of expertise [39]. Although some authority areas of the coaching sciences may give emphasis to one branch of knowledge ahead of others, most expert coaches should be able to demonstrate proficiency in all domain specific knowledge areas that are associated with the coaching process [10]. However, to conduct a study of analysis that examines a coaching practitioner's ability to use and manipulate the volumes of information of each and every specific knowledge domain would not only prove too complicated but would also suggest that there is no interplay between domain specific knowledge areas – two issues that have hindered traditional research in this area of study. With this in mind a need exists to identify more appropriate determinants of expertise, benchmarks that will be more reflective of the processes that separate exemplars of expertise from well structured practice. For the purposes of locating determinants of expert coaching practice in interceptive sports, we consider it important that researchers are guided by the suggestions of ecological psychologists

and be directing more attention towards the notion of environmentally driven actions such as an emergent decision making.

Recent research has already proposed the possibility of using a retrospective analysis of environmentally driven actions as a potential determinant of expertise. Ferrari, Didierjean and Marmeche [40, 41] and Williams, Ericsson, Ward and Eccles [42] have successfully drawn attention to experts combining environmental information with domain specific knowledge structures for the purposes of encoding live interactive action. This notion of encoding live action enables the expert practitioner to calculate or prepare future actions. Ferrari and colleagues have identified an 'avante garde' like performance trait that separates expert chess players from the less experienced players. Similarly, Williams and company have recognised that experience military personal can engage a heightened sense of anticipation as a means of making informed judgement calls when engaged in simulated work environments. While both concepts certainly represent abstract notions of a human phenomena, it is the product of these concepts – an emergent decision making process, that could stand as a tangible means of determining expertise [see 6, 26, 42, 43, 44].

What is most interesting about Ferrari and colleagues' suggestions is not that the decision making process is proven accurate, but the scope for which the expert can retrospectively account for the reasons behind the process. This notion of accountability lends itself well to Ericsson and Smith's [38] call for reproducible performances in laboratory environments and cater for the extremely dynamic nature of interceptive sports such as invasion games but also games of strategy such as chess. Contrary to past research endeavours in expert coaching practice, this perceptual cognitive perspective offers a potential means of first identifying and then possibly measuring expertise in such a way that it can be developed further. The focal point of this perceptual cognitive perspective for locating expertise in interceptive sports coaching is personified by a practitioner's ability to combine environmental cues with domain specific knowledge structures to foresee a means of achieving a set objective [see 46]. A primary challenge to the strictly cognitive accounts of expertise was that such accounts did little to uncover and point to the vast detail that was relevant to decoding the processes coaches used when making decisions in the 'heat' of intense competition [42, 47]. It is expected that through a deeper understanding of the professional judgements that coaches use to justify their decisions one could gain a

greater understanding of what it is that constitutes mastery of the coaching process and this might act as a defining principle of expertise

Summary

The notion of expertise in interceptive sport coaching remains as contested as the sports that these coaching practitioners are involved. Research currently portrays expertise through a number of subjective lenses. For example: Erickson, Cote and Fraser-Thomas [30] among others have published research that proposes expertise is built on ten or more years, or ten thousand hours, of specific experience. Yet there are other bodies of research that align with the view of Horton, Baker and Deakin [48] who suggest expertise is suitably determined by researching coaching practitioners who fulfil national coaching roles. According to Chi [16] such subjective determinates of expertise whilst of value may well represent an unintended impediment to research and subsequently limits our professional understanding of expertise in interceptive sport coaching.

There is a growing body of opinion that suggests that we reconsider the value of research that fails to accurately validate the criteria used for identifying expertise. Ericsson and Charness [49] support such a statement by suggesting that experts need to consistently demonstrate a level of superior practice and not simply be alleged an expert. Abraham, Collins and Martindale [4] concur with such a perspective by suggesting that a series of explicit benchmarks need to be developed for future research. However, in spite of this growing opinion, the research field has found it difficult to arrive at any level of consensus regarding the determination or location of expertise.

While professional agreement regarding the locale of expertise remains unanswered the situation has motivated researchers to look beyond the traditional determinants of expertise. The inevitability of this need for redirecting research has recently been highlighted by the work of, Côté and Gilbert [50] who propose expertise as being the product of a symbiotic relationship between interpersonal, intrapersonal and domain specific knowledge structures. In a similar vein to the suggestions of Côté and Gilbert, the advocacy in this paper for the recognition of an Emergent Decision Making Process (EDMP) is bound to a coaching practitioner's capacity to forge and

harvest mutually beneficial information streams between domain specific knowledge structures and the environmental information that stems from interceptive action.

This proposal for an Emergent Decision Making Process as a key performance indicator of expertise is not entirely new. The proposition of exploring decision-making, as a possible indicator of expertise, has ebbed and flowed since the 1980s. In fact, the literature reviewed for this paper has identified five unique theories - each espousing decision making as a performance indicator of expertise. Models and theories such as the Recognition Primed Decision-making Model [51], the Situational Awareness Model [52], the Recognition / Meta-cognition Model [53], and the all encompassing Naturalistic Decision Making theory as espoused by Klein, Orasanu, Calderwood, and Zsombok [51], have each directly or indirectly advocated for a greater recognition of decision making as an indicator of expertise.

A most interesting consistency among these models is that each considers the quality of decisions made by practitioners as the measure of expertise. However if we are to follow the direction of ecological psychologists, that we re-focus our existing research agenda towards the ideas surrounding emerging decisions, then perhaps the future of identifying and determining expertise lies in the past. Perhaps if we are to enhance our understanding of expertise in interceptive sports coaching than we need to revisit the notion of a decisions making process. However rather than focusing on the action, the answer to identifying and determining expertise may lie in analysing decisions retrospectively. Searching for and qualifying the processes coaching practitioners engage (the blending of certain knowledge structures with specific information streams) to generate such actions.

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