Effective Talent Development Environments: Bridging the Theory-Practice Gap within a UK Context

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ABSTRACT

Performance sport has become a high priority for many Nations. For example, the UK distributes approximately £25 million per year through their World Class Performance programmes in order to aid effective identification, development and performance of our best athletes. Not surprisingly, in line with a more professional and scientific approach, the standards of sporting performance at an elite level are constantly improving. In order to remain competitive on the international stage, the processes and support mechanisms within our talent development environments (TDEs) must be effective in order to maintain a consistent stream of talent, capable of success at the highest level.

Unfortunately, the structure and evidence base for talent development (TD) processes within the UK is weak and lacking in evidence-based guidance for those working 'on the ground'. This is compounded by an apparent procedural bias towards the identification of talent as opposed to its development, a focus which is contrary to much of the research in this area. Against this backdrop, the objectives of this thesis are as follows:

1) To identify the 'needs' within current TD practice and provide clear direction and methodological guidance for the required programme of research,

2) To identify guidelines through a triangulation of evidence that enables the application of effective TD procedures,

3) To develop a tool to help bridge the theory-practice divide and enable practitioners and researchers to examine TDEs within applied settings, and

4) To provide preliminary validation of the tool to assess the extent to which it has discriminant function.

In addressing the first objective, chapter 2 provides a critical overview of key policy and guidance for TD procedures within a UK context. Additionally, relevant research from both TD and coaching literature is presented and provides the rationale for the direction and methodological requirements of the programme of research. The second objective is accomplished through work presented in chapters 3, 4, 5 and 6. Three qualitative studies, including a desk top study, interviews with 16 expert development coaches, and interviews with 43 developing athletes provides a triangulation of evidence from which TDE guidelines are developed. These guidelines and the associated declarative knowledge base are subsequently used to aid the development of the Talent Development Environment Questionnaire (TDEQ). Accordingly, objective 3 is addressed in chapter 7 which reports the systematic generation of questionnaire items and an exploratory factor analysis that reveals a 54 item, 12 factor structure TDEQ. In addressing the final objective, chapter 8 presents a discriminant function analysis which reveals the TDEQ had excellent predictive abilities, where 81% of developing athletes are correctly discriminated on the basis of the quality of their TDE.

In conclusion, the five studies in this thesis aim to provide a significant contribution to current knowledge by highlighting key 'areas of need' within a TD context (applied and research); identifying key features of effective practice; and developing and validating a tool which enabled the application of evidence based practice. Future recommendations include further examination of the validity of TDEQ. Specifically, a confirmatory factor analysis and longitudinal research across sports and contexts would allow a more substantial assessment of its value as a tool to aid practitioners within applied and research contexts.

AUTHOR DECLARATION

Edinburgh, August 2008

I hereby declare that:

a) I have composed this thesis,

b) This thesis is my own work and,

c) This work has not been submitted for any other degree or professional qualification except as specified

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
CFA	Confirmatory Factor Analysis
DFA	Discriminant Function Analysis
DOTS	Development of Talent Study
EFA	Exploratory Factor Analysis
LTAD	Long Term Athlete Development
MANOVA	Multivariate Analysis of Variance
NGB	National Governing Body
TD	Talent Development
TDE	Talent Development Environment
TDEQ	Talent Development Environment Questionnaire
TID	Talent Identification and Development
TOYA	Training of Young Athlete Study

CHAPTER 1 – INTRODUCTION

1.1 Interest in Talent Identification and Development (TID)

Long gone are the days where the natural selection and development of athletes would effectively culminate in the production of a top class international sports team. The full time professional nature of many elite level sports means that phenomenal standards of excellence are required. Accordingly, for competitive world class levels of performance to be sustained, methods of identifying and developing the most talented athletes must be continuously researched and improved in order to make best use of available resource. In line with the rise in world class sporting standards, there is ever increasing financial reward, recognition and national benefits associated with success.

As such, it is not surprising that interest in effectively identifying and developing sporting talent has grown over recent years, and has become big business (Abbott, Collins, Martindale, & Sowerby, 2002). For example, in 1994, Australia launched the Talent Search scheme to identify and develop talent within a working time frame for the Sydney Olympics 2000. In the UK, through UK Sport, the delivery of the 'World Class Programmes' drives the development of talent. Within Scotland, 'Sport 21, Nothing Left to Chance' identified three main aims that include the recognition and development of sporting talent. Of course, with the 2012 Olympics being hosted by London an even sharper focus on developing and identifying potential stars has been created in Britain, culminating in initiatives such as 'Sporting Giants' (EIS, 2007). Other countries, such as Northern Ireland, South Korea, Spain, Malaysia, USSR, GDR, and Cuba have also made TID a high priority (Abbott et al., 2002). However, while there is an increase in the interest in TID, it is

apparent that many programmes and National Governing Bodies (NGBs) have focussed predominantly on the early identification of talent at young ages, at the expense of the arguably more crucial process of nurturing and development. This 'identification and selection' focus appeared to come from the belief that the best youngsters will be the most likely to become the best senior performers and that, by starting specialised training early, greater gains will be made. Based on this apparent bias, it seemed timely to consider the process of development through an emphasis on the environmental characteristics of effective talent development (TD).

1.2 Current Guidance within British Sport

The talent development environment (TDE) and the way in which it shapes, challenges and supports developing talent is crucial for success (Bloom, 1985; Csikszentmihalyi et al., 1993). Indeed, for some time research has shown (e.g., Bloom, 1985) that it is extremely difficult to predict or identify those who would eventually become experts in adulthood, and while "precociousness in a talent field is not to be dismissed; it can only be realistically viewed as an early stage in talent development. There are many years of increasingly difficult stages of talent development before mature and complex talent will be fully attained" (Bloom, 1985; p538). Unfortunately however, even research evidence of the need for a strong development focus seems to be overshadowed by the apparent bias towards the belief that identifying talented individuals at young ages is the key to unlocking elite level success (Cote & Hay, 2002; De Knop, Engstrom & Skirstad, 1996; Hill, 1988; Hill & Hansen, 1988). Indeed, this is perhaps exaggerated by the fact that in a number of cases performance coaching has been treated as "a non problematic aspect of the purposeful improvement of sports performance" (Lyle, 2000 p.3). For this reason it

was important to examine the guidance that is currently available to those involved in coaching talented youngsters and those in charge of developing policy for TD procedures, in order to identify any likely gaps in evidence based practice.

Although Green (2007) has highlighted that comparatively British sport lacks focus, supporting organisations, initiatives and policy documents have emerged to aid progress (e.g., Sport England (2004) document 'The Framework For Sport in England: Making England An Active And Successful Nation: A Vision For 2020'; Long Term Athlete Development (LTAD) model). Unfortunately, while the LTAD model (e.g., Stafford, 2005) that underpinned the whole of British policy in this area provides a starting point, there may be serious problems given the apparent lack of support it received empirically, for example:

> "The adoption of the LTAD in British Sports Policy is, in our opinion, particularly misguided given the lack of proper research evidence (well any actually), moreover, changes made to NGB development programmes on the basis of the LTAD (some think) are potentially detrimental to the development of young talent. Some think it has nothing to do with elitist sport reframing it as an athlete retention model. Scientific interrogation of the model remains impossible since the LTAD refers to virtually no science and includes no research data."
>
> Sport Development, 2006, p.1

1.3 Objectives of the Thesis

Given the apparent importance but comparative dearth of research into this topic, there appears to be a clear need to evaluate current policy models more systematically with reference to research. Also, given the requirement that guidance (usefully) needs to impact on coaching and coaching education, it seems sensible to present a critical picture of coaching research to unearth any methodological recommendations and to enhance the likelihood that this programme of work could impact positively 'on the ground'.

While the success of TD programmes is ultimately based on how many people progress successfully through and out the end as successful experts, the need to focus on the processes of effective practice is crucial. Due to the long term nature of TD, utilising outcome funnels as a sole measure of effectiveness provides little timely feedback on the reasons for success or indeed, what might be improved on. Furthermore, it takes no account of the quality of the people that are starting at the beginning of the process, and therefore a measure of success on output alone may be skewed by the population going through it. Many coaches appear to be rated as good coaches (at least implicitly) because they are coaching good quality athletes and/or winning teams, regardless of the quality of their processes. This is a dangerous assumption to make in light of the considerable evidence which suggests that this type of 'win' focus can be detrimental of the long term development of players (Barnsley, Thompson, & Legault, 1992; Baxter-Jones & Helms, 1996; Bloom, 1985; Deci & Ryan, 1985; Gould et al., 1982; Helsen, Starkes & Van Wincle, 1998; Moore et al., 1998; Richardson & Stratton, 1999). As such, it is clear that both an understanding and measure of effective processes is required to enable those involved in the development of talent to fine tune and improve their environments effectively over time. These considerations were paramount throughout the design and execution of this thesis, which accordingly set out to address the following objectives:

1. To identify the 'needs' within current TD practice and provide clear direction and methodological guidance for the required programme of research.

2. To identify guidelines through a triangulation of evidence that enables the application of effective TD procedures.
3. To develop a tool to help bridge the theory-practice divide and enable practitioners and researchers to examine TDEs within applied settings.
4. To provide preliminary validation of the tool to assess the extent to which it has discriminant function.

1.4 Overview of Programme of Work

In addressing the first objective, chapter 2 provides an overview of some key TD models currently utilised in the UK, and presents relevant research from both TD and coaching literature. Through a critical review of this information, important research gaps and applied needs became apparent. Also, the rationale for the direction and methodological requirements of the thesis became clear. Specifically, the thesis aims to provide a programme of research which tackles current needs within TD, and added value to the current body of knowledge and the application of evidence based practice.

Chapters 3, 4 and 5 address objective 2, and focus on building an understanding of what effective practice is and how it can be best applied. As such, this stage of the work concentrates on the development of an empirically rigorous set of guidelines for effective TD procedures. In line with this need, and given the importance of utilising multiple source evidence for effectively identifying good practice (e.g., Chivers & Darling, 1999) this section of the thesis aims to triangulate qualitative evidence from a number of sources.

First, chapter 3 provides insight into what guidance or information research could provide to clarify what effective practice is likely to 'look like'. This is

presented through the form of a desk top study which collated information from a range of relevant areas of research. This provides the basis for a structured and empirically based set of guidelines. While there appears to be a lack of evidence base for current policy guidelines, it was important to gauge whether current practice 'on the ground' also reflected this problem. In order to assess this, chapter 3 also presents a comparison of the emergent guidelines with examples of current practice. Indeed, if there was enough evidence to formulate some level of guidance, particularly if it contradicted practice, then the provision of well evidenced guidelines with practical applicability would be more of a priority than perhaps first indicated.

Second, the need to assess the knowledge and perceptions of expert talent developers within the UK system is recognised in order to provide an up-to-date, context specific and expert insight into the aims, procedures and rationale of effective practice. This was carried out through in-depth, retrospective interviews followed by both inductive and deductive analysis. This provided a richness of data regarding important declarative and procedural knowledge and also an examination of the level of coherence between the guidelines developed through chapter 3 and chapter 4.

The final part of the triangulation of evidence came in the form of an examination of the experiences of talented youngsters within the UK. Specifically, information was gleaned relating to the athletes' career pathways, their needs and their perception of useful TD processes to date. This provides the 'clients' perspective on useful practice and barriers to development in the current climate. Again, as with chapter 4, this utilised an inductive then deductive analysis of interview data to provide grounded insight and also an examination of the extent of

support for the other two stages of the triangulation. This three pronged process aims to provide an evidence based insight into the nature of effective practice, particularly with the intention of providing clear guidelines, and an indication of the general applicability of these across different sports within the UK.

In order to summarise progress and identify further needs of the research, chapter 6 provides a short critique of the guidelines and their limitations, and highlights the key issues for further development through the final two chapters of the thesis. This helps to provide a basis on which to present the work in chapter 7, which addressed objective 3. This outlines the process by which the features of effective practice as identified through chapters 3, 4 and 5 were developed into a measurement tool.

It was clear that there was a need to develop such a tool in order to aid the dissemination and practical application of the guidelines, particularly as the extent to which coaches will read and apply academic research will be limited. Further considerations were apparent, for example, given the qualitative nature of the first stage of work, there was a need to explore the generic nature of these guidelines across sporting populations. Also, the factor structure of the guidelines was yet unknown and, while chapters 3, 4 and 5 provided a face valid representation of the key features of effective practice, given the naturalistic, inter-related and complex nature of TD, further statistical examination was required. As such, the orthogonal and concise nature of the guidelines is explored in order to provide more understanding and validity of what constitutes the key features of effective practice. chapter 7 describes the process by which the Talent Development Environment Questionnaire (TDEQ) was developed. The first process of item generation involved

a number of stages utilising experts and developing athletes. Following this, exploratory factor analysis (EFA) and examination of psychometric properties of the TDEQ were carried out, which involved several hundred developing athletes.

Although the development of the TDEQ items and the EFA provides a statistically concise structure to the tool, the meaningfulness and applied validity of the tool still needed further investigation. While ideally, research examining the extent to which the tool/guidelines could be shown to be causative of more effective development outcomes would be presented, this type of longitudinal research presented practical problems. First, to see the outcome funnel of young athletes entering different systems and coming out the other end is likely to take at least 6-8 years of work, as such there would need to be a dedicated set of coaches willing to utilise (or not!) the guidelines for that amount of time in order to assess the impact on their throughput. Second, this appeared to be well beyond the scope of this PhD thesis, particularly in terms of timescale. However, it is recognised that presenting preliminary evidence of discriminant validity of the guidelines was important. Accordingly, objective 4 was tackled in chapter 8, whereby an examination of the discriminant validity of the TDEQ was carried out through a Discriminant Function Analysis (DFA). This involved five high quality TDEs and five lesser quality TDEs being used to test the discriminant abilities of the TDEQ. Chapter 9 then presents the general discussion and conclusion of the thesis, pulling together key issues and recommendations for future work.

CHAPTER 2 – TALENT IDENTIFICATION AND DEVELOPMENT MODELS, EMPIRICAL RESEARCH AND METHODOLOGICAL CONSIDERATIONS

2.1 Introduction

As chapter 1 outlined, while there has been a comparative lack of focus into the development of effective TD procedures within British sport (Green, 2007), the need for optimising efficiency within sport has already been acknowledged. For example, a review of high performance sport by the DCMS (Cunningham Review, 2001) highlighted that talented young athletes must be helped more to reach an elite level and identified the need for a more systematic approach to TID, led by Governing Bodies on a sport by sport basis. This led to over 40 recommendations being put forward covering World Class Performance plans, facilities, athlete funding, coaching development, athlete support systems and development of UK Sport. In 2002, the 'Game Plan: A Strategy for Delivering Governments Sport and Physical Activity Objectives' was published outlining key issues within UK performance sport. Again, the Government highlighted that the UK approach to TD was ad hoc and sporadic.

Many youngsters were identified as over competing, under training and specialising too early, resulting in premature peaking and/or never reaching their full potential. There was found to be a lack of focus on basic skills, where early identification procedures were pressuring further unwanted specialisation at young ages. Within the funding and service provision structure there was significant duplication, complexity and ambiguity for developing and elite level athletes. Early models of World Class for National Lottery Funding utilised three strands of funding (World Class Performance, World Class Potential and World Class Start) based on

the stages of the Sports Council Development Continuum; Foundation; Participation; Performance; and Excellence (see Figure 2.1). The aim of the model was to form a representation of the experiences and requirements of developing performers, and thereby cater effectively to their needs, however, this has been problematic.

Even within the definitions of the aims of the 'stages' of progression there has been inconsistencies, however. For example, 'World Class Start' was paired with 'Participation', where some of the key aims of one, for example 'to identify and support young people with talent' do not seem compatible with the aims of the other 'exercising one's leisure option and taking part in exercise primarily for fun and enjoyment, and health and fitness reasons'. Perhaps more importantly, evidence showed that there was confusion as to which stage athletes were currently at and some athletes didn't perceive to have progressed along the stated continuum (Moore et al, 1998). Furthermore, the number of sports bodies (e.g., UK Sport, Sport England, UK Sports Intitute, BOA) involved in providing funding and service opportunities led to confusion and dissatisfaction amongst coaches, athletes and NGBs (Carter Report, 2005). This confusion made it difficult to see how funding allocation and support was catering effectively for athlete support and development.

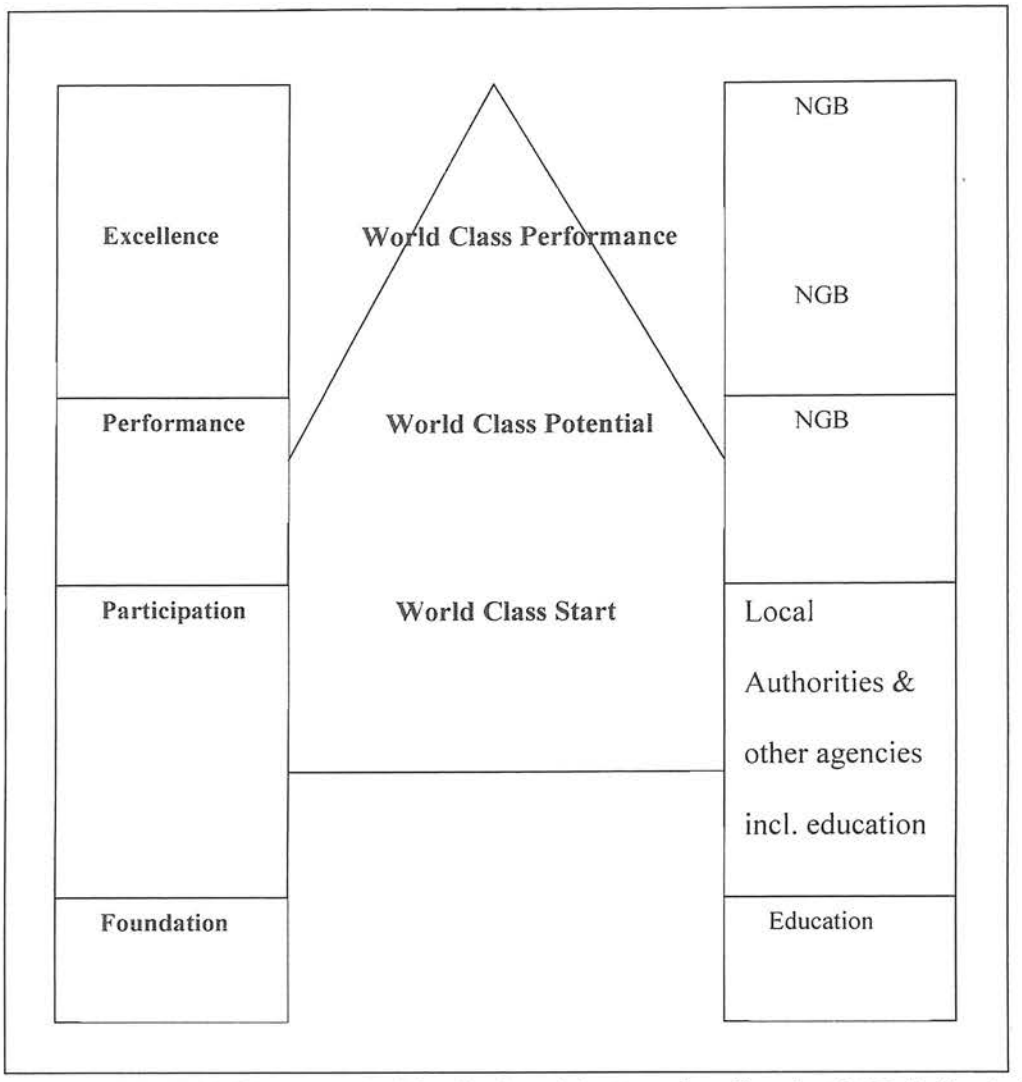

Figure 2.1. World Class model for National Lottery funding in 1993 (Adapted from DCMS, 2002)

2.2 Promoting Efficiency of Resource Management

In April 2006, in order to improve the efficiency of service and funding provision within performance sport, UK Sport was given full responsibility for all Olympic and Paralympic performance related support in England. This meant that the World Class Performance Programmes for TID (World Class Development and Talent) right through to elite level performance (World Class Podium) was aligned within the same Body. UK Sport became "primarily

responsible for the confirmation, development and performance of world class elite athletes and Sport England was primarily responsible for sustaining and increasing participation in formal and informal community sport" (Sport England, 2007, P8 (what we do and how we do it)) (see Figure 2.2)

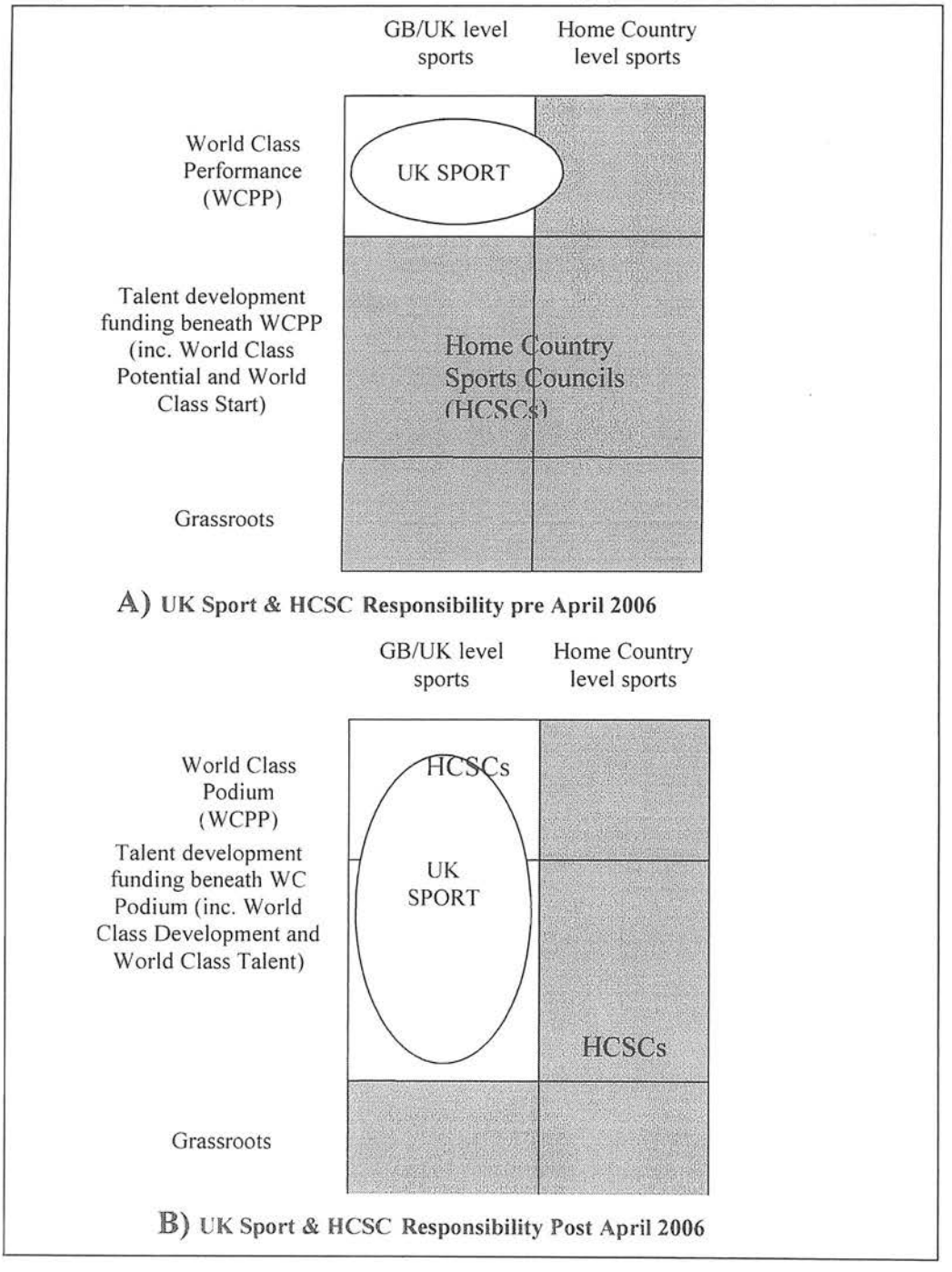

Figure 2.2. Representations of the shift in responsibility in UK & English sport

This simplification of resource management provided an opportunity for more efficiency and coherent thinking through a 'One Stop Shop' for service and funding provision for elite performance development. For example, now that one body (e.g., UK Sport for GB sports) held full responsibility for developing and producing world class performers, it was more likely on a political level that the angst to produce 'age group winners' could be de-emphasised, with a firmer and more coherent drive placed on achieving world class senior success. This is important because outcome measures such as age group success is often seen as a marker for effective development (e.g., Collins, 2008), and particularly in situations where the role of 'development' and the role of 'high performance' are separated, can become a misguided and dominant marker for developmental success. The problem being that the drive to peak at junior levels can leave athletes burnt out, de-motivated, injured or poorly prepared for the step up (Gould, Feltz, Horn, & Weiss, 1982). Further evidence of this comes from data that showed that 'representative' or the highest performing junior athletes (U19s & U20s) often aren't the ones that go on to world class standards as senior performers (Collins & McPherson, 2008; Douglas & Martindale, 2008).

2.3 Problems with Evidence Based Practice in British TD

While these long overdue but appropriate updates have been made, the claim that recommendations within government policy had "been developed through independent analysis of the facts and the figures underpinning sport, and through research and impact evaluation" (DCMS, 2002; Game Plan) hit problems within performance sport. There appeared to be a lack of thorough investigation and importance given to performance sport within the Game Plan Document (Sport

Development, 2008), due to the lack of any empirically based guidance produced. Even so, the LTAD model utilised (Balyi, 1990; Stafford, 2005), still formed the backbone of key British Sport Policies, across NGBs, even with little evidentiary basis or academic scrutiny (Sport Development, 2008).

The outline of the model can be seen in Figure 2.3 and comprises of five stages including Fundamentals; Learning to Train; Training to Train; Training to Compete and Training to Win.

	Females	Males	Activity	
Training to Win	17+	18+	Integration phase. All physical, technical, tactical and mental capabilities established 25:75 training – competition ratio	High Performance
Training to Compete	13-17	14-18	Investment phase. Develop technical and tactical skills 50:50 training - competition ratio	Specialisation
Training to Train	10-13	10-14	Learn how to train. Develop the basic skills of a specific sport. 75:25 training – competition ratio	Recruitment
Fundamentals	6-10	6-10	Basic Sports Skills (physical literacy) – running, jumping, throwing ABCs (agility, balance, co-ordination, speed) Development of power and endurance Participation in variety of sports (no competition)	Talent identification

Figure 2.3. Cited from Game Plan: a strategy for delivering Government's sport and physical activity objectives' (DCMS/Strategy Unit, 2002, p.125)

While the authors of LTAD highlighted the need to build and update the model through empirical research, the lack of it is a major problem. The model appeared to present some face valid, common sense ideas and recommendations (albeit inconsistently – Bayli, & Hamilton, 2000). For example, it highlighted the importance of developing generic skills as a motoric base for subsequent development of sport specific skills, long term focus, and the advantage of multi sport participation at early stages. However, there was a distinct lack of detail in the information regarding the application of such guidelines and, more importantly, a dearth of empirical support and rationale for the guidelines that had been presented and developed since 1990.

On first glance, there were a number of problems within the basic tenets of the model. For example, it was recommended that talent identification takes place between the ages of 6 and 10, seemingly in contrast to the findings of the Government where early identification and selection was a cause of unwanted specialisation. Further examples of unsubstantiated guidance included the 'late' incorporation of psychological skills development, even though early psychological development appears to be key to future development and participation (e.g., Abbott et al., 2002; Gould et al., 2002). Tactical development was incorporated in the third stage of the model (ages 13–18), even though skills development through tactical understanding has been promoted by many researchers and practitioners alike as more effective (e.g., Griffin, Mitchell & Oslin, 1997). Finally, the suggestion that those in the training to win stage needed to divide their development programme time into '25% training' and '75% competition' seemed improbable for many sports. For example, the Lawn Tennis Association recommend 20% matches and 80%

training (5% other sport; 35% tennis fitness; 40% tennis training) for those players between 17 and 18 (Abbott et al, 2002), roughly equivalent to the beginning of the Training to Win Stage. When you consider more physically orientated sports such as Olympic rowing, this ratio seems even more unlikely. For example, Matthew Pinsent (multiple Olympic gold medallist) at his peak trained between 2 and 5 times a day, covering around 200km per week on the water, with additional gym work in order to build the fundamental endurance and power required to accomplish what he did. This would appear to require more than the recommended 25% training guidelines.

Another major component of the model is the idea that windows of opportunity exist, whereby the biological stage of development is crucial in identifying when most benefits will be gleaned from different aspects of development (e.g., strength, endurance, speed, skill). The implication made by Balyi is that, if a youngster misses a 'window of opportunity', then the potential gains possible during the window can never be regained. In other words, 'windows of opportunity' implicitly suggest, as does the structure of the LTAD model, that youngsters must be identified at early ages and subsequently be training 'seriously' for events that they will eventually compete in, to ensure crucial development opportunities are not missed. This is a serious claim particularly because the majority of current researchers in the field of TID refute the both the effectiveness and ethical nature of such practice (e.g., Abbott & Collins, 2004; Baker, 2003; Bloom, 1985; Cote, 1999; Durand-Bush & Salmela, 2002).

Even with general disagreement in the literature, it is worth presenting a critique of Balyi's evidence. For example, Bayli suggested that by strength training when high levels of testosterone are circulating the body, more strength gains can be

made. This fact is strongly supported elsewhere (e.g., Storer et al., 1988), and is why athletes who cheat often use testosterone illegally in their training regime. However, phases of high testosterone in children are associated with growth spurts, which are also associated with increased strength gains in untrained individuals. A meta-analysis by Viru, Loko, Volver, Laaneots, Karlesom, and Viru (1998), which mainly used cross sectional designs, consistently reported timeframes for strength improvements to be strongly associated with the latter stages of sexual maturation.

However, there was no hard evidence that gains at this stage may not be recoverable, as stated by Bayli. In fact, Viru, Loko, Harro, Volver, Laaneots and Viru (1999) highlight that "further research is necessary to establish whether sensitive periods represent optimal time for realising specific training tasks" (p.107). The methods required to test Bayli's 'permanent strength loss' hypothesis would firstly, need to tease out the differences in strength gains from testosterone 'fuelled' training and growth changes, and secondly, and more importantly, would need to take a longitudinal approach. Two groups (ideally identical twins) would need to either train or not train during the 'window of opportunity', and then at a later time both groups would need to be trained and compared for strength gains. Unfortunately, this type of work would be both difficult to control and unethical. So, while there is evidence to suggest that faster development would occur through such a testosterone filled window, no evidence supports the implication that the window must be exploited in order not to lose the ability to realise those potential developments.

A similar example relates to the 'motor skill window', where Bayli claims that "if the fundamental and basic sport specific skills are not established before ages

11 and 12 respectively, athletes will never reach their optimal or genetic potential" (Bayli & Hamilton, 2003, p.8). Although Bayli does point out that while "skills cannot be recaptured at a later time, carefully planned and implemented remedial programs can contribute to limited success" (Bayli, 2001, p.2). These claims are based upon Rushall's (1998) review of Borms (1986) paper 'the child and exercise: an overview', where Rushall states that "most authors agree that the sensitive skill learning period is between 9 and 12 years. Very early training may produce learning of a less economical nature. Later starters would soon catch up. One must not confuse performance with skill. Early maturers will compensate, usually advantageously, for lack of skill with strength and leverage" (Rushall, 1998, p. 27). In fact, Rushall also provides an explicit summary of the implications for this issue, which distinctly lacks suggestion of any danger of permanent loss of potential, focussing more on the usefulness of late specialisation, whilst providing general stimulation and fundamentals first (Jess & Collins, 2003):

> "Implications: Up to the age of 8, children should enjoy a variety of stimulating activities to develop a general base of physical and movement aptitudes. From then on, more detailed instruction in particular skills can be entertained but against a backdrop of general stimulation. It has been shown that, in general, children who specialise early will lack the 'background' development of capacities for flexible maximum responses in the later years, and higher performance categories, of participation" (Rushall, 1998, p 27).

This example, once again, shows how the recommendations in the LTAD model seem to miss the generally accepted stance that general fitness, motor ability and motivation are the key requirements for future success, extrapolating implications far beyond the data and opinions available; implications, which if taken literally, would have serious consequences for practice. Interestingly, many of Bayli's suggestions are also in contradiction to literature on the many psychosocial

issues of long term development, such as burn out and motivation (e.g., Cote, 1999; Gould et al, 1982).

Such lack of theoretical and empirical support is particularly worrying given the potential consequences of following the 'recommendations' and the enormous emphasis that was put on evidence based practice in sport as well as other areas (Coalter, 2000; DCMS, 2002; Wallace, Tuck, Boland, & Witucki, 2002). Indeed, the amount of influence this unsubstantiated LTAD idea has had is extraordinary, where the 'LTAD has been described as the "Golden Thread" that permeates the 2004 National Framework for Sport, it appeared as the preferred model (well the only model actually) in the Governments (2002) Game Plan National Sports Policy' (p1, Sport Development, 2008), see Figure 2.4.

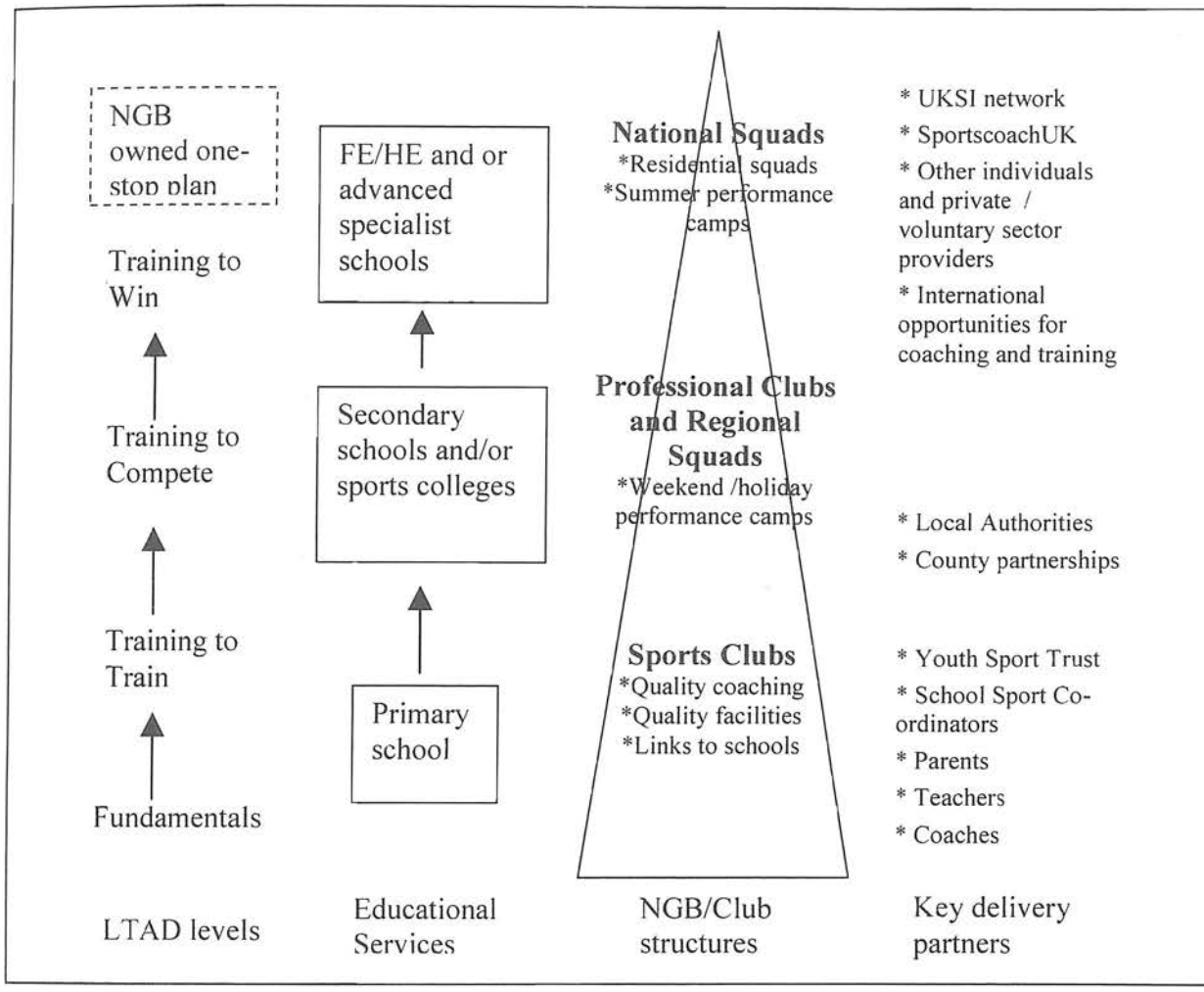

Figure 2.4. Cited from Game Plan: a strategy for delivering Government's sport and physical activity objectives' (DCMS/Strategy Unit, 2002, p.127)

2.4 Lack of Accurate Representation of Athletic Pathways

Whilst it is clear that recommendations must be based on sound evidence, it is also important that models for resource provision and support (e.g., Figure 2.4.) accurately reflect the athletic experience. A lack of validity in the structure of these models is problematic, and many researchers have highlighted the importance of clearly understanding 'clients' experiences' (Bloom, 1985; Csikszentmihalyi, Whalen, Wong, & Rathunde, 1993; Kelly, 1955), particularly as they do not always

match expert opinion (e.g., Morgan, Sproule, Weigand & Carpenter, 2005). Examples of this 'consumer-centred' approach can be seen in a variety of other fields of research, including coaching (e.g., Poczwardowski, Barott, & Henschen, 2002), leadership (e.g., Vallerand & Losier, 1999), education (e.g., Orme & Starkey, 1999) commercial services (e.g., Church, Javitch, & Warner-Burke, 1995), and healthcare (e.g., Wallace, Tuck, Boland, & Witucki, 2002).

However, within the UK model (Figure 2.4), counter intuitively perhaps, a significant role for FE and HE in the 'Training to Win Stage' of TD is highlighted, where a 'limited' role of sports clubs fits with only the 'Fundamentals and Training to Train Stages' (ages 6-14). However, support in the UK for elite level development at Universities is not prioritised compared with many countries, and has also been shown to be problematic (Moore et al, 1998). Additionally, while supporting elite athletes in Universities in the USA has been a major concern, remarkably little is known about its impact in the UK (THE, 2008). This is perhaps not surprising when you consider that certain US college sports generate millions of dollars for the college programmes, and scholarships can easily be worth $25,000 to an athlete (Riffle, 2008). However, even at a top British University such as Loughborough, elite scholarships may only be worth about £4000, barely enough to cover tuition fees, some living costs and facility hire.

Furthermore, the model does not highlight key UK specific barriers to success. For example, to dispel the popular belief that sports stars are pampered in their ways to Olympic glory, Searle, (1993) highlighted that 84% of the athletes who represented Britain at the 1992 Olympics said their sporting potential was limited by the need to maintain employment, and of these, 42% earned less than £10,000 a year.

Until recently at least, many of our top sports stars clearly become successful at their own expense or the expense and commitment of their families, and therefore it is not surprising that many decide not to (or do not have the choice to) commit to the chance of sporting glory. These pressures in the UK are likely to exacerbate two key drop off points that exist in the Britain, one when children choose to specialise in education in Year 12 and again when they leave school (DeKnop, Engstrom, Skirstad & Weiss, 1996), again a common experience that is not represented in the model of LTAD.

It could be tempting to take practice and policy from other countries, but given the many culturally specific issues, it would be risky to uncritically adopt them (e.g., AIS or US Varsity Programmes) without specific, empirical evidence. For example, in the USA American Football has a draft system in which fresh faced college stars compete for places year on year within professional clubs, something which simply can't exist in the British system because this is not where the majority of our young talent develops from. Furthermore, different sports have different levels of funding and performance pathways, as such, as rightly outlined in the Government Policy Game Plan (DCMS, 2002), autonomy for NGBs over how to best utilise support and funding would likely lead to more effective practice assuming good leadership was in place.

Thus with the inability of current models to accurately represent, or provide any substantial evidence base for recommendations, it is clear that research must gain an understanding of the nature of athletic development and the aims and systems required to promote effective TD. Well guided, up-to-date and context-specific research is needed to create an understanding of where our efforts and resources are

needed most, and in turn could lead to the development of a truly accurate and universally accepted framework for guiding support within UK sport. Of course before a research programme can be established effectively, past academic research must be examined in order to find out what empirically and theoretically driven work is already available to guide future research.

2.5 Foundations of Academic Research on TID

The first, and one of the few large scale investigations of TD was Bloom's US based research programme published in 1985. This study provided sufficient detail and explicit focus to give insight into the nature of athlete development; specifically, how talented performers actually progress from novice to elite status. Bloom (1985) presented a model of TD that was generic across several domains of expertise, including sport. It suggested that athletic development is characterised by three stages – Initiation, Development and Mastery. Importantly, movement between the stages was not determined by chronological age or some pre determined cut off point, but rather was characterised by certain tasks being completed, relationships or attitudes developed, or learning achieved. For example, the progression from Stage 1 (Initiation) to Stage 2 (Development) was, in part, characterised by the development of an athletic identity: in other words, children realising that they were no longer children who swim, they were swimmers. The three stages and associated transitions were explained and described in a detailed and holistic manner, including behavioural (e.g., increasing commitment, becoming more obsessed), cognitive (e.g., increasing task orientation, developing an athletic identity), and social factors (e.g., more technical coach, less parental involvement, identified as talented). A simplistic version of Bloom's model can be found in Figure 2.5. However, while the idea of

transitions was usefully presented as part of the description of the general development process, guidelines addressing how they could best be managed or used to enhance development is unclear and was not an explicit focus of the work. If we are to use this work to help coaches develop youngsters, it is increasingly important that implications exist for enhancing practice.

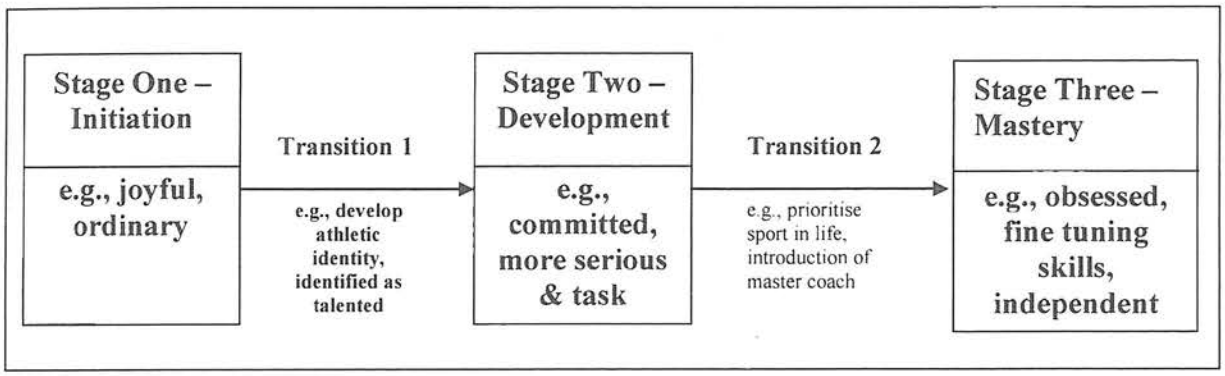

Figure 2.5. Simplistic version of Bloom's (1985) stage model of TD (Adapted from Bloom, 1985)

2.6 Culturally Specific Issues in TD

Bloom's stage model was insightful and, through its detailed nature together with the importance it placed on transitions, could prove very useful for guiding support to athletes. While Bloom's model has been supported and expanded through subsequent work to incorporate more stages (e.g., Cote & Hay, 2002; Durand-Bush & Salmela, 2002; Scanlan, Ravizza, & Stein, 1989) the work is based solely on investigations outwith the UK, mainly in the US, which appears to present a serious limitation to transferring such a model to the UK given the apparent context specific nature of TD.

In this regard, the importance placed on sport, and the systems that aid athlete development in the US are very different from those found in the UK. For example, the structure and support networks within US colleges differ greatly to those found in

British universities, as examples earlier highlighted; consequently it would be impossible to compare the experiences of developing athletes at such a time and hence, perhaps naïve to assume similar problems and support requirements existed. The context specific nature of TD is further highlighted by research suggesting that, within the UK, a 'master coach', is not always available or is only accessible by a select few (DOTS, Moore, et al., 1998). This is not to say that they are in other countries, but getting top coaches coaching where they are needed is still a key concern in the UK. Additionally, further socio-environmental features of 'Transition 2' are apparent within a UK context, such as increased social constraint and added pressures of high-level sport. These additional demands themselves may be problematic; a key finding from the UK based Training of Young Athletes study (TOYA; Rowley, 1992), which represented the only other major investigation of British youth sport in the last few years.

The importance of transition periods has been highlighted in many research areas (Bee & Mitchel, 1984; Hellstedt, 1995), and can be described as the periods when change, of any type, trigger the need for adaptation, either large or small, in order to maximise development. For example, such periods included becoming more independent, getting selected for a team, leaving home to go to college, becoming an elite athlete, or starting puberty. If they are handled poorly they can be traumatic, but if managed well they can be highly developmental and influential in the eventual achievement of an elite profile. Indeed, Sinclair and Orlick (1993) suggested that it is often successful transition that determined future success rather than 'in stage' performance per se. So it appeared crucial that these 'periods of change' are

supported appropriately in order to facilitate successful and optimal development in our athletes.

Evidence from the Development of Talent Study (DOTS - Moore et al., 1998) identified well defined, sport specific, 'problem periods' evident within UK sport in the 1990s. Specifically, transitions were characterised by conflicts between educational and work demands with sport prioritisation, an area also highlighted by other research (e.g., Training of Young Athlete Study (TOYA); Rowley, 1992; Stevenson, 1988). Examples of these major 'problem periods', as perceived by NGB officers and coaches in British sport that were found are presented in Figure 2.6.

Sport	Key periods	Opinion of NGB officers and coaches
Athletics	18 – 23	Leaving school and going to college causes problems, maybe for example, relating to money, new coach, new friends, new course, and long distance relationships. I don't know many institutions that provide the right academic counselling and training support
Cricket	18 – 21	A boy can play U19 cricket, but really he needs to play first class cricket before the age of 20, but within our system you've got to win the next game, so the more experienced players are picked. Progress slows and sometimes halts, they can slip back and be lost.
Cycling	18 – 23	The success at senior level is nothing like it is at junior level (U19)
Gymnastics	10 – 16	It is a question of building the educational day around training rather than the way we do it in this country. It's not too much competition in gymnastics, usually the school want them to play netball the day before something like the British championships
Hockey	17 – 21	Leaving school and going to university (especially boys), few universities can provide what they have at school
Netball	16 – 19	Pressures at exam time, then they go to university and we lose a lot of them, but we're changing the age groupings to

	18 – 22	take the pressure off and hopefully give us a transition from sixth form to university.
Rugby League	**14 – 18** **19 – 21**	Basic player development comes between 14 – 19 but they get too many games and can't train and learn properly, especially the best. When they are too old for the academy side, that's the crunch and a lot don't make the senior game
Rugby Union (women)	**21 – 25**	Leaving university and going to work, the jump from university to club rugby is seen as being too great.
Sailing	**18 – 23**	Between 18 and 23 there are things they don't have, good organisation, money and transport. We need to put in place structures that cope with 'sports transitions'

Figure 2.6. Major transition periods expressed by NGB officers and coaches (Adapted from DOTS, Moore et al., 1998)

Findings from the TOYA study (Rowley, 1992) reported that major reasons why many developing athletes drop out include 'conflicts of interest' or 'having other things to do' (Rowley, 1992: TOYA and Retirement, p.9). 'Sensitive' periods appeared to exist where young athletes were more vulnerable to dropping out or retiring early; for example, immediately prior to or following exams, and after leaving school, when they must decide on full time employment or a full time career in sport. Three quotes from DOTS (Moore, et al., 1998) highlighted the need to support athlete transitions and include them in any model of TD.

> "Some things have gone not so bad. But, in order for me to make the transition into senior world rankings a little more support is needed."
>
> Transitional Athlete 1

> "When younger I found I had to rely on my parents frequently. Now as I am a student, I do find it difficult to find the financial resources required to stay at the top level. There is support until 18 then there is a huge gap...resources are needed to help the 18 to 25 age group."
>
> Transitional Athlete 2

> "They need three things in order to be successful: organisation, transport and money. When they leave home or go to university these are just what they lack."
>
> Official 1

This work provided important insight into the development process, indeed, guidance helping to bridge the research-practice gap would be valuable. Of course, although these 'periods of change' are important, transitions are not the only times when athletes needed specific support. Appropriate resources must also be directed towards understanding and promoting coaching environments that effectively facilitate development once certain stages are reached, or prepare young athletes proactively for any potential upcoming transitions. Considering the context specific nature of effective coaching and the obvious relationship between an athlete's position along the developmental continuum and the type of coaching environment required (e.g., Douge & Hastie, 1993), effective practice and procedures must also be identified and established using a sound understanding of athletes' needs at particular stages throughout their career.

2.7 The Importance of an Holistic Approach to TD

Bloom's (1985) work developed an in depth, descriptive picture of the athlete characteristics and influences throughout their careers. Unfortunately, within sport, no other work has unpacked the TD environment in such an in-depth and holistic manner as Bloom (1985). However, other TD specific research has supported the holistic nature of effective development (Brustad, 1993; Cote, 1999; Csikszentmihalyi et al., 1993; Durand-Bush & Salmela, 2002; Gould et al., 2002). For example, Gould et al., 2002 showed that athletes developed over a long period of time and were influenced by large variety of people and institutions. They concluded that individual and systems approaches were needed in combination, where key

individuals in an athlete's socialisation network are educated both formally and informally as to how to foster desirable characteristics. Interestingly, the span and variety of influential areas that were identified included the community, family, individual development, non-sport personnel, sport environment personnel, and the sport process.

Within each of these sources, a broad range of factors such as role modelling, individual attention, clear expectations and standards, support, success experiences, opportunities, direct teaching, motivation, and positive attitudes helped to develop the athletes. In line with previous research (Bloom, 1985; Csikszentmihalyi, et al., 1993) coaches were found to provide, amongst other things, a challenging yet supportive environment, took time to individualise programmes, understand the athletes as people, provided positive growing environments with positive and helpful feedback, built good communication patterns, and an overall positive attitude. As with Bloom's (1985) work, Gould et al. provided a useful insight into the holistic nature of the sources of development for athletes, and presented several methods and domains by which the athletes are influenced. However, a focus on the identification of the required aims and systems that promote effective TD was missing (i.e., clear guidelines for practice). As such, little structure or mechanism was provided to help guide future TD research, inform coaching practice, or to help to improve and monitor TDEs. Given, the requirement to consider a wide range of factors in effective TD procedures, future research would usefully take careful consideration before focussing on just the on-field training or competition behaviours of coaches and significant others (Abraham & Collins, 1998; Abraham, Collins & Martindale,

2006) or single out only one important aspect of an environment, for example motivational climate (e.g., Ames, 1992; McArdle & Duda, 2002).

2.8 Identifying Effective Methods of TD Research

Early exploration of the efficacy of coaching practice predominantly focussed on investigating the behaviours that are exhibited by coaches. Through behavioural observation, a number of characteristics have emerged to identify 'effective' coaches. Although the criteria for this efficacy are often unclear, in general, such individuals provide frequent feedback, incorporate numerous prompts and encouragements, provide high levels of correction and re-instruction, use high levels of questioning and clarifying, predominantly engage in instruction, and manage the training environment to achieve considerable order (e.g., Claxton, 1988; Douge & Hastie, 1993).

There is little doubt that these factors are important for effective coaching. However, there are many factors apparent in the literature that mediate the exact mix of optimum behaviour, and this multiplicity of influences imply that certain behaviours are more appropriate under certain circumstances. Indeed, this highlighted the need for context specific work, an opinion supported by Douge and Hastie (1993) in their review of coach effectiveness. Furthermore, although a general template for coach effectiveness has been developed through behavioural research, its efficacy is questioned, beyond the need for context specificity, through its insensitivity as a tool. It has been demonstrated that observational methods are often too crude to distinguish between expert and less expert coaches (Abraham, Collins, Smethurst, & Collins, 1997; Sherman & Hassan, 1984), highlighting that it may not be the behaviour itself that characterises effective coaching, but rather the timing and

rationale behind it. Indeed, research emphasising this point showed that novice coaches used more instruction and reward than expert coaches (e.g., Claxton, 1988), although these tools were initially associated with more effective and 'better' coaching.

Furthermore, other coaching research methodologies focused on the differences in planning and knowledge between experts and novices. Research highlights that experts plan in a much more focused way (e.g., Jones, Housner, & Kornspan, 1995), and have deeper, more complex reasoning underlying the use of various coaching tools to achieve their aims (Abraham et al., 1997). Unfortunately, once again, this research is limited through its inability to practically aid effective coaching practise within TD because it provided no mechanism for development (i.e., what exactly do we encourage coaches to do?).

In summary, it is important to ensure that research is carried out in a context and culturally specific way (Bloom, 1985; Douge & Hastie, 1993; Moore et al., 1998), particularly given the predominant focus of much coaching research on participation and athlete satisfaction as opposed to performance or TD (Chelladurai, 1990; Smith & Smoll, 1996). However, there are further, perhaps more subtle implications for informing the nature of effective research into expert coaching. This is particularly important in TD, given the importance of taking an holistic approach.

Through critical analysis of coaching and teaching research, Abraham and Collins (1998) have highlighted that examining the declarative and procedural knowledge of experts is crucial in understanding the nature of 'coach effectiveness' and for providing a mechanism for coach development. Further critical review of the theoretical underpinning of knowledge structures (Abraham, Collins, & Martindale,

2006) has highlighted that, because of the likely combination of tacit, semi tacit and explicit knowledge that coaches use in their decision making, future research methodologies will require carefully planning. This idea emerges clearly through studies where coaches unknowingly overlook well documented and empirically supported coaching behaviours such as instruction in their descriptions of what they do in practice (Claxton, 1988; Côté, Salmela, & Russell, 1995a; Côté, Salmela, Trudel, Baria, & Russell, 1995b). As such, the subsequent recommendations highlighted that 'significant probing, alternative giving and in depth discussion of decisions taken is essential if we are to generate the clear conceptual knowledge that offers the best vehicle for developing coaching prowess in others' (Abraham et al., 2006, p.9). In other words, in this context, research must rigorously examine the key procedural, and importantly the central declarative knowledge that experts use to develop good practice in TD, thus providing a method to gain an holistic insight into the aims and systems (and associated rationale) that need to be in place to help young athletes progress effectively along this flexible and dynamic development pathway.

2.9 Summary of Research and Practice – Implications for Research Development

2.9.1 High TD Interest, Low Evidence Based Practice

Chapter 2 outlined that developing talented individuals to succeed at the top level in sport is an extremely significant priority in many nations' objectives. At this current time it is especially important for Britain with the 2012 London Olympics only a few years away. Unfortunately, although there is a major focus on evidence-based practice across a variety of professions and policy development in the UK, TID appears to fall short, particularly in the process of developing those with

potential to the top. While the LTAD model (Stafford, 2005) is used to form the backbone of development policy, it lacks empirical support, provided limited practical application and a poor representation of athlete experience. In other words, recommendations are being provided (with poor detail regarding practical application) and models of athlete experience offered without evidence for their efficacy or validity, which is generally considered poor practice in this day and age. As such, there is a clear and topical gap for applied research in this area.

2.9.2 Current Research and Cultural Differences

If we turn our attention to the research that is available, and specifically focussed to inform TID practice, Bloom (1985) and its subsequent support (e.g., Cote & Hay, 2002; Csikszentmihalyi et al., 1993; Durand-Bush & Salmela, 2002) forms the best model available. Unfortunately, this work and the support it has received is mainly USA-based, and given the many cultural differences between the USA and UK, including most pertinently the embedded systems of sports development, we must be careful in adopting such evidence in the UK context. Indeed, it appears that in the UK, transition periods appeared to be far more important than stages per se. However, more work is still needed to investigate the implications and guidelines for the successful management of these important aspects of development have not been focussed on with any depth. Therefore, while the baby must not be thrown out with the bath water, this research highlighted that culturally specific work is needed to take place in order to develop evidence based guidelines more directly applicable in the UK.

2.9.3 Current Research and Clarity of Focus of Future Research

The majority of coach effectiveness research focussed on participation levels and athlete satisfaction, and has not explored performance coaching or TD in excellence settings. Indeed, the importance of context specific work has long been highlighted (Douge & Hastie, 1993), and clearly there must be a TD focus for future work. Furthermore, when the current work pertinent in TD is looked at carefully (e.g., Abbott & Collins, 2004; Bloom, 1985; Cote, 1999; Gould, Dieffenbach, & Moffett, 2002), it is clear that much of it has focussed predominantly on the athlete and their experiences, and not on the aims and systems that are required in an effective TDE. Where more depth had been sought at the developmental stage (Bloom, 1985), it has been outwith the sporting context (Csikszentmihalyi et al., 1993). Of course, while these are important topics for TID and must be incorporated into future work, the chapter highlighted a specific evidence base missing in the literature. Furthermore, much of the TID work outside of Bloom (1985) focussed on single aspects of development (e.g., psychological characteristics; motivational climate), and have not examined the more holistic nature of the development of talent, and therefore future work would sensibly examine TID from a holistic view point (Gould et al., 2002). Finally, the generic nature of TD is consistently apparent in the literature not only across sports but also across expertise domains (e.g., Bloom, 1985). As such there is strong evidence to suggest that there may well be generic principles and features to effective TD practice, and, at this early stage in research development it would be sensible to explore generic principles as opposed to sport specific factors associated with effective TD.

2.9.4 Methodological Considerations

Clear methodological considerations have emerged from the coaching and TD literature. Firstly, expert TD coaches (with clear criteria for quality assurance) must form a significant part of the work identifying good practice within the UK context. Explicitly, there must be rigorous exploration of their knowledge about the needs of athletes, and the aims and systems that are necessary for effective practice. Secondly, the experiences and perceptions of athletes needs to be examined, in order to ensure an accurate representation of their UK experience, incorporating the exploration of the needs, problems, good and bad experiences of current developing athletes throughout the developmental continuum. This of course will add a context specific and up to date analysis of the current state of UK athletes' experiences.

2.9.5 Implications for this Programme of Work

There are cultural limitations apparent in TID, a lack of evidence based practice and subsequent guidance in the UK, and given the fact that TDEs are certainly the most consistent and immediately controllable factor in the life of a developing elite and, given the high levels of resource, its important and central role is acknowledged by sports, institutes and governments alike. As such, this programme of work aims to focus on the development of culturally specific TD guidelines for UK sport. One important delimitation is the selective involvement of coaches and athletes who have significant experience in the UK context at the appropriate level and are therefore are in a position to be able to inform such developments. Indeed, both intuition and recommendations from the literature highlight the need to have these individuals as a central focus of this programme of

work, specifically the need for rigorous examination of both expert knowledge and the perceptions and experiences of current athletes.

Furthermore, as highlighted above, the research currently available suggested that there is a strong generic aspect to developing talent, across many domains of expertise, within and out with sport. Therefore, the focus of this programme of work will be on examining the generic nature of TD as opposed to any sport specific development processes. As well as being the sensible first step in examining TD processes given the limited available research; if generic principles are the key drivers of effective practice then this has a number of advantages. Firstly, generic principles will provide a platform on which many sports can move forward in both practice and research, with consideration of individual sport and situation specific factors. Secondly, universal principles will allow a more easily co-ordinated set of guidelines to permeate across sports and NGBs, allowing the possibility of a more coherent and transferable practice being delivered to young athletes as they develop, which is particularly important given the varied and unpredictable nature of development (Moore et al., 1998).

Finally, given that athletes have different needs at different stages in their development (Bloom, 1985), there needed to be an explicit clarity of focus within any future research. Given the particular importance and pertinence of the development of 'potential', this thesis will focus on examining the needs of athletes and the subsequent aims and systems required for those who have been identified as talented (i.e., potential to become successful on a world class stage) and are actively pursuing excellence, as outlined by the characteristics of Bloom's (1985) development stage. Although, given the integrated nature of the stages and

transitions that are potentially associated with successful TD, the work may need to draw on the 'levels' above and below to provide a more full and integrated picture. However, a 'development stage' (Bloom, 1985) focus will allow a suitable in-depth examination of the key issues, with presentation of a transparent evidence base within specific parameters, from which TD specific recommendations can emerge.

CHAPTER 3 – TALENT DEVELOPMENT: A GUIDE FOR PRACTICE AND RESEARCH WITHIN SPORT

3.1 Introduction

Chapters 1 and 2 highlight the undoubted interest in the development of sporting talent, exemplified through government investment around the world. Unfortunately, the evidence base for policy in the UK and the practical applicability of subsequent guidelines on a day to day coaching level appeared to be lacking. While the majority of research in this area has taken place outside of the UK, which is important given cultural differences and the identified need for context specific understanding, Bloom (1985) has highlighted the possibility of generic guidelines through a holistic view of TD. In this respect, the movement away from behavioural towards more knowledge based and decision making investigation within coaching research has highlighted the need for procedural knowledge and guidelines to be accompanied by an understanding of the underpinning declarative knowledge which supports them. This also makes sense from a practical viewpoint, for example, role guidance for many youth sport coaches was shown to be implicit, and therefore a theoretically and empirically driven model of effective practice supported by underpinning declarative knowledge would be highly beneficial to effective critical reflection and the development of practice (Falk, Lidor, Lander, & Lang 2004; Gilbert & Trudel, 2004).

Accordingly, the aim of this chapter was to present holistic and generic guidelines for effective TD processes (i.e., procedural knowledge), which were clearly based on a range of available empirical evidence (i.e., declarative knowledge). By drawing on and reviewing a range of relevant work and literature,

messages emerged consistently to form guidelines. The key themes that consistently emerged from the review were collated and presented throughout part one of this chapter (with their associated support and rationale). These represented a best effort at a balanced and supported view of a broad and integrated picture of what is known to date (A summary of the aims and systems which appear to characterise effective practice are then presented in Figure 3.1). In the final section of this chapter, these guidelines are considered against brief exemplars of current practice in order to emphasise the importance of the development of such a model to aid the enhancement of practice that unfortunately, often runs contradictory to this information. Indeed, these exemplars of world-wide practice were used to further highlight both the need and direction for further research and more broad education of a model of effective TD, from which practitioners and researchers can critically reflect on what they do.

3.2 Methods

3.2.1 Literature Search

Given the breadth of potentially relevant information and areas of research for this review study, the following criteria were used to guide the literature search. First, work needed to be seen to be relevant to one or more of the following areas; the aims of effective TD; the needs and experiences of young developing athletes; and/or the design and operation of environments that provide for the realisation of potential. Second, the work needed to be empirically based and not reliant on anecdotal or biographical information.

Whilst there may already have been more comprehensive reviews of specific areas of research explored (e.g., motivation), given that there appeared to be a lack of

evidence based justification for holistic TD procedures, this review aimed to satisfy the need to provide a broad and integrated picture of what was known about the development of talent, in order to critically reflect on what we do. As such, within each section, not all the evidence utilised in the review is cited, however, enough evidence is provided in order to explain and warrant justification for the guidance that emerged.

3.2.2 Content Analysis

The literature collated was subjected to a form of content analysis in order to provide an emergent set of guidelines based from current relevant empirical knowledge. This utilized a hierarchical content analysis and involved three stages, 1) coding experience; 2) inductive inference and; 3) similarity processes (Cote, Salmela, Trudel, Baria, & Russell, 1993). Themes and categories that emerged from the collection of empirical research articles (Patton, 1990) were represented in part one below and are supported by referenced materials and explanation (Cohn, 1991). Furthermore, the results of the content analysis were summarized through the themes and higher order themes presented in Figure 3.1.

3.2.3 Trustworthiness

Several steps were taken to establish trustworthiness of this process. First, two researchers were consulted on the comprehensiveness of the literature review process and search results. Second, the emergent themes and categories were presented with their associated evidence to two researchers and discussed until a satisfactory, concise and encompassing set of themes were agreed upon. Third, the results of the review and content analysis were subjected to multiple peer reviews

and associated changes until considered acceptable for publication (Martindale et al., 2005).

3.3 Part 1 – Supporting Literature for Effective TDEs

3.3.1 Premise 1 – Long Term Aims and Methods

3.3.1.1 Long Term Vision, Purpose and Identity

Most, (if not all) NGBs and sports councils have had visions of developing talent where the priority was to ensure that their athletes can develop to, and successfully perform at, the highest senior international level. This concept was reflected in Bloom's (1985) instrumental study in TD, where ultimately successful development into the world's top 25 in their field was not necessarily accompanied by top performance at junior levels. In other words, the development of successful elite seniors may have required a different development approach to the production of high level performing age groupers. Specifically in this regard, Bloom's work has presented a staged model of progression where, for individuals to move on successfully, they needed to have reached certain levels of skill, learning, attitude, or relationships, but did not necessarily obtain overt levels of performance success at different age groups. Indeed, the following quote highlighted the weak relationship that often exists between performance standards at different levels of development.

> "Being good in one phase of the learning may not have a high relation to being good at a later phase, even though both phases are in the same talent field...without the purposeful step by step talent development process, it is unlikely that even the individuals we studied (top world 25) would have reached the high levels of talent development reported."
>
> Bloom, 1985, p.532-534

The poor predictive validity of junior performance standards for later success, and therefore the need to move away from such a focus, was highlighted by statistics from Bloom's (1985) work where less than 10% of the now successful elite adults

were thought to have been at a performance level by the age of 11 or 12 sufficient to indicate that they would have achieved what they eventually did. As a further implication, it is worth considering that if 90% of eventual world top 25 athletes did not necessarily shine supreme at young ages, what chance is there of identifying the future 'journeyman pro' and distinguishing them from other enthusiastic young sportspeople solely through early performance standards? The necessity (or not) to perform at a high level at young ages was further highlighted by soccer in England, where only two players had represented internationally at every age group including senior level, Michael Owen and Terry Venables (who interestingly, only gained one senior level cap). These statistics question the appropriateness and the usefulness of focusing on and rewarding the explicit development of highly successful age-group sportspeople.

In similar fashion, Helsen, Starkes and Van Wincle (1998) found that international hockey players, on average, did not reach their peak until their late twenties, highlighting that there is no rush to produce young star performers. In fact, it has been known for some time that early specialisation and emphasis on all age groups winning is associated with early drop out and wasted talent (e.g., Baker, 2003; Gould, et al., 1982; Valeriote & Hansen, 1986; Wall & Cote, 2007). There is also clear evidence to show that early specialisation doesn't actually provide developmental advantages (Barynina & Vaitsekhobvski, 1992; Bompa 1995). Consequently, it is clear that the development of an explicit long term vision, purpose and identity with associated processes is required.

3.3.1.2 The Importance of Systematic Planning and Implementation

It is known that a long term focus is required to become an expert (Bailey & Morley, 2006; Bloom, 1985; Ericsson, Krampe, & Tesch-Romer, 1993; Howe, Davidson, & Sloboda, 1998; Starkes, Deakin, Allard, Hodges, & Hayes, 1996), but what seems less clear is the nature of this focus throughout development. As such, long-term projects require effective co-ordination and once operationalised, these long-term goals must direct and integrate a wide variety of important factors to ensure processes effectively help our youngsters achieve their long-term potential. Such a clear system would provide a philosophy that coherently drives the aims and practices of TID, the coaching process, funding, resources, evaluation, coach reward, competition and club structure. This complex process and the number of people and factors involved in coherent practice require systematic planning and implementation in a number of areas. Indeed, it has been shown that development within complex environments benefit greatly from systematic and deliberate planning (Ollis, Macpherson, & Collins, 2006).

Systematic consideration of long term requirements is crucial. For example, many governing bodies appeared to be adopting early identification and specialisation policies because perhaps intuitively it seems, the earlier a youngster starts, the sooner large quantities of practice can be achieved (Cote & Hay, 2002; De Knop, et al., 1996; Ericsson et al., 1993; Ewing & Seldfeldt, 1996; Hedsrtom & Gould 2004; Hill & Hansen, 1988; Soberlak & Cote, 2003). However, this simplistic view failed to account for many developmental, motivational and psychosocial factors (Baker & Cote, 2006) and ignored the associated negative consequences, such as burnout (Wiersma, 2000). It became increasingly apparent that the engagement in

playful and varied non-domain specific activities was valuable at early stages of development, perhaps preferable (Wall & Cote, 2007), where late specialisation (13-17) appeared to be an important predictor of the quality of later skill development and required motivation (Baker, Cote & Deakin 2005; Cote & Hay, 2002; Cote, 1999; Durand-Bush & Salmela, 2002).

Indeed, many skills are transferable and reduced the subsequent levels of deliberate practice required to become elite (Baker, Cote & Abernethy, 2003; Côté, Baker, & Abernethy, 2007). It must be recognised that long term development of expertise incorporated many more issues than just the ability to learn to perform successfully. For example, issues of motivation and long term adherence (Bloom, 1985; Deci & Ryan, 1985; Durand-Bush & Salmela, 2002; Vallerand, 2001), well managed perceived competence (Kirk, 2005; Margas, Fontayne & Brunel, 2006; Sternberg, 2000), the importance of fundamental cognitive and motor skills (Beamer, Cote & Ericsson, 1999; Ericsson, 1998) and access to the necessary opportunities (Bloom 1985; Collins & Buller, 2003; Csikszentmihalyi et al., 1993; Durand Bush & Salmela, 2002; Harre, 1982) are all crucial. In conclusion, long term visions must systematically and explicitly drive the systems that influence athletes, coaches, parents and society. For a variety of reasons, it has appeared easy to ignore evidence from research at both an individual and system level. While early specialisation has been common practice, and may help develop youngsters quickly into successful age group performers, it is far less effective for long term development.

3.3.1.3 Reinforcement at a Number of Levels

It appeared from the literature that such a systematically implemented long-term vision needs to be reinforced at a number of levels; this may be a major

problem in delivering wide spread coherent practice. The development of appropriate attitudes and behaviours has been shown to be important (Abbott & Collins 2004; Bloom, 1985; Brustad 1992; Csikszentmihalyi et al., 1993; Salmela, 1996; Smircich, 1983) and beyond initial (and ongoing) family influences, one important aspect of this process involved the establishment of an appropriate ethos or culture, which can act as a self-reinforcing coherent environment (Armstrong, 2001; McKenna, 2000; Richardson & Thompson, 1999; Storey, 1995). Research has shown that this can be achieved through the development of a common identity and commitment that guides individual and group goals, reflects appropriate conduct and performance standards, and is reinforced through consistent reward systems (Ashforth & Mael, 1996).

Indeed, the development of a 'community' through the integration of athletes and staff across ages and abilities can help to promote and reinforce the required culture (Cote, Macdonald, Baker, & Abernethy, 2006; Foster-Harrison, 1997; Pancoe, 1999; Veenman, 1995). Such development also promoted a social system stability that encourages a positive and reinforcing environment, and helps promote understanding and motivation by explicitly making sense of an 'organisation's' function, long-term goals, and links between the two (Richardson & Thompson, 1999; Storey, 1995). Of course, implicit influences also play a large part in shaping peoples' expectations and practice (Cote, et al., 2006; Schein, 1983). These work at a number of levels and, as such, it is imperative that the systems people have implemented are assessed to understand the impact they have across the whole TD process, how and what they are subsequently reinforcing and promoting.

For example, consider the explicit and implicit 'reinforcement' and 'guidance' that systems give which make it a necessity (and therefore a focus and

pressure for all involved) for young developing athletes to reach certain 'outcome' performance standards in order to gain select opportunities or funding. As mentioned previously, consequences of such a system include a high likelihood that many youngsters with future potential will be missed due to the insistence of providing specialist selective training and opportunities at early ages only to those who performed well. Evidence suggests it could be almost impossible to 'catch up' once de-selected (Csiksentmihalyi & Robinson, 1986; Krampe, 1994; Starkes et al., 1996) resulting in early de-selection meaning permanent de-selection, with a subsequent reduction in talent base and quality at the top. A potential confound related to the physical maturity benefits to 'performance' at young ages in certain sports, and as such will (when there is a focus on performance!) bias selection policy and opportunity toward certain youngsters, namely those older in their year group (e.g., Baxter-Jones & Helms, 1996; Helsen, Hodges, Van Winckel, & Strakes 2000; Richardson & Stratton, 1999).

This initial selection may have resulted in a subsequent self-fulfilling process of selection, training, interaction, improvement and selection of those initially involved (Dweck, 1986; Solomon, Striegel, Eliot, Heon, & Maas, 1996). Indeed, Ward and Williams (2003) concluded that the higher skill levels of 'elite' soccer players as young as 8 are likely to be as a result of the 200 hours of expert coaching they have received as opposed to any genetic superiority! Furthermore, Abbott et al., (2002) highlight that, while this 'school of hard knocks' may produce results through selecting and progressing only those who can consistently produce the goods, it does appear to significantly influence the proportion of 'older' players who are selected at senior level (Barnsley, Thompson, & Legault, 1992), and furthermore many of those

born late in the selection year tended to drop out early (Helsen, et al., 1998). Self imposed selection systems are potentially important sources of perceived competence and may impact a self-fulfilling prophecy in young people and coaches, as well as the only sound developmental opportunities, factors known to be extremely important for progression (Bloom, 1985; Deci & Ryan, 1985; Solomon, et al., 1996).

While the evidence suggested that early selection based only on performance leads to many with potential not getting the necessary opportunities, ironically, those who are selected early may also be at a disadvantage, unless given strong guidance. While they will improve initially early achievers may be prone to premature drop out through competitive pressure or lack of informed guidance (Bloom, 1985; Gould et al., 1982; Moore et al., 1998; Ommundsen, Roberts, Lemyre, & Miller, 2006). Furthermore, those selected may miss crucial (long term) development experiences (e.g., Cote & Hay, 2002) by focussing too much on performance as opposed to learning (Ericsson, 1998). Thus, while many may 'win' at junior levels, they may end up ill prepared to make the important step to senior level and fail to make the transition (e.g., Moore et al., 1998; Stafford, 2005).

When the contradiction between advice emanating from the literature and the many systems currently in place is considered, it is clear that much more needs to be done to operationalise our long term aims explicitly. Systems of selection and funding opportunities based on early performance criteria seriously undermine the goals and expectations of long term development plans through the system. For example, many coaches' (plus athletes' and parents') expectations and understanding are shaped by perceived or real rewards for producing 'winning' age group teams (Collins, 2008), whereby selection policies will be influenced by the extent to which

youngsters can help a team win at that time, as opposed to providing those with long term potential a good developmental experience. Of course, the selection criteria for funding also have similar concerns. In other words, representative selection policies, development programmes and funding policies can be to the detriment of individual long-term development, working systematically against the long term NGB visions developed in the first place. In conclusion, these all too common situations highlight the need to prioritise long-term aims and methods more explicitly through a multitude of contexts throughout the whole lifespan of sporting development.

3.3.2 Premise 2 – Wide Ranging Coherent Support and Messages

3.3.2.1 Provide Coherent Philosophies, Aims and Methods at a Variety of Levels

The previous section presented evidence for the importance of long-term procedures in effective TDEs; obviously there are a large number of factors influencing youngsters as they develop within their sporting careers and lives, including the aims and practices of TID, the coaching process, funding, resources, evaluation, and coach reward, competition and club structure (Bailey & Morley, 2006; Fraser-Thomas, Cote, & Deakin, 2005). In fact, recent research into the development of Olympic champions (Gould et al., 2002) showed the wide range of long-term individual and institutional influences that may significantly influence development, can reach far beyond the sporting context. Csikszentmihalyi et al. (1993) concluded that development will not occur unless the talent is valued by society, and recognised and nurtured by parents, teachers and coaches.

Potentially, with large numbers of key influences in youngsters' lives, it is extremely important to understand how powerful the effects of coherent messages

from these various influences can be. Evidence from behaviour management clearly showed the positive effects on people's behaviour when clear objectives were presented in conjunction with equally clear and unambiguous reward and reinforcement contingencies (Siedentop, 1978); particularly where care is taken to understand the impact that perceptions and intentions play on motivation (Lepper & Greene, 1975). Even at elite level, key factors associated with training commitment such as self-motivation, reinforcement skills, perceived control, outcome expectancies and group norms, can be directly influenced by external sources (Palmer, Burwitz, Smith, & Collins, 1999).

Additionally, the importance of developing coherent systems at different levels is exemplified by research which showed that, even with long-term objectives, if rewards and assessment are not compatible with the long-term aims of learning, people will pursue what they perceive to be important (Entwistle & Kozeki, 1985). Especially with younger, less informed and focused individuals, these are often the choices that offer immediate gratification which could well be counter productive to long-term development. Other factors influencing the patterns of learning adopted include emotions, school ethos and parental involvement (e.g., Bloom, 1985; Entwistle, 1987). Again, the message is clear, it is crucial for development policies to encourage coherent philosophies, aims, and methods within (and outwith) TDEs, highlighted the need for careful consideration of a wide range of factors. Indeed, in a similar fashion, coaches must be encouraged to develop athletes for long-term success through a coherent system at a number of levels, where reinforcement is both clear and consistent. For example, it would be counter productive to provide funding and recognition to those that produce winning age group teams, without referral to

long-term development achievements. If real change is to occur, careful consideration of the influences of our coaches and TDEs are paramount.

3.3.2.2 Educate Parents, Schools, Peers, Coaches, and Important Others (and Encourage Positive Contributions!)

Coaches are influential, especially once a step has been taken by an athlete to become more serious about a sport (Bloom, 1985; Durand-Bush & Salmela, 2002; Gould et al., 2002). However, they are not the only people to influence young talent, and the importance of the family (Bloom, 1985; Brustad, 1993; Cote, 1999; Cote & Fraser Thomas 2007; Martin, Dale, & Jackson, 2001; Ommundsen, et al., 2006) and school life is clear (Abernethy et al 2002; Brustad, 1993; Csikszentmihalyi et al., 1993; Durand-Bush & Salmela, 2002; Weigand, Carr, Petherick, & Taylor, 2001). The combination of non-pressured preparation, challenge and support helps foster certain skills and attitudes that pay dividends in the long-term (Cote, 1999; Csikszentmihalyi et al., 1993; Gould et al., 2002), and the necessary practical and financial support and development of a variety of support networks is often parent led (Bloom, 1985; Durand-Bush & Salmela, 2002). Indeed, there is evidence to highlight that key individuals in the athletes' socialisation network need to be systematically educated and involved appropriately to foster desirable characteristics (Brustad 1992; Cote & Fraser-Thomas, 2007; Durand-Bush & Salmela, 2002; Gould et al., 2002; Gould, Lauer, Jannes, & Pennisi, 2006; Fraser-Thomas, 2005; Ommundsen, et al., 2006; Robinson & Carron, 1982; Wolfenden & Holt, 2005).

3.3.2.3 Utilise Role Models at a Number of Levels

Research highlighted the effects of observing role model on peoples' behaviour and attitudes, such as moral reasoning (e.g., Bandura & McDonald, 1963).

It is clear that any influential people, for example parents, can have a large impact on a child's beliefs and attitudes (Bloom, 1985; Brustad, 1993). If appropriate, these positively influenced attitudes can pay dividends for the long-term development of talent (Cote, 1999; Csikszentmihalyi et al., 1993; Gould et al., 2002). Of course, different people at different times can be more, or at least equally as, influential as others. This included a wide range of individuals from coaches, teachers, schools, peers, and achieving or already successful adults (Cote, 1999; Csikszentmihalyi et al., 1993; Durand-Bush & Salmela, 2002; Gould et al., 2002). Hence the utilisation of a variety of positive role models at different levels is required to maximise the impact on the development and choices of any youngster (Abernethy et al., 2002; Brustad, 1993), particularly, if the athletes mix across levels and ages (Cote, et al., 2006; Foster-Harrison, 1997; Pancoe, 1999; Veenman, 1995).

3.3.2.4 Open Communication Patterns

Educational sessions are an obvious method of informing those important influences, but involving parents more directly could also be key. Evidence suggested that the more interest and encouragement given by parents, the more likely youngsters will stay involved, even at elite level (Weiss & Hyashi, 1995). In fact, such support may be crucial; for example it was found that in England around 40% of elite athletes aged 25 and under were still financially dependant on parents (Moore et al., 1998). The reciprocal socialisation effects of sport involvement (Weiss & Hyashi, 1995) may also be useful for fostering extremely effective support networks, particularly if parents are given appropriate opportunities to contribute positively. Furthermore, it would seem that there must be ample opportunity for effective communication patterns, not only between parents and coaches, but also university,

work and other involved and important parties (Cote & Fraser-Thomas, 2007; Macphail & Kirk, 2006; Martin, et al., 2001; Weirsma, 2000; Yogev & Ronen, 2001). These types of communication patterns are how problems or conflicts can be solved in the interest of the athlete and not those with most power. Organisational psychology highlights that effective organisations explicitly promote clear expectations and open communication systems to allow provision for any conflicts that may arise (Bemowski, 1996).

3.3.2.5 Set up a Variety of Support Networks

Within the UK, research highlighted the context specific nature of TD, where stages are less clear and transitions are more crucial (Abbott et al., 2005; Moore et al., 1998). Certainly the idea that transition periods are critical to future success is widely recognised (Durand-Bush & Salmela, 2002; Macnamara, Holmes, & Collins, 2006; Sinclair & Orlick, 1993). The variety of support available and the range of mental skills utilised by an individual determine how beneficial a transition may be, and this could be the key to successful development (Abbott et al., 2002; Holt & Morley, 2004; Schlossberg, Waters, & Goodman, 1995; Sinclair & Orlick, 1993; Wylleman, Alfermann, & Lavellee, 2004). A range of other UK research highlighted the need to investigate and acknowledge the nature of sport-specific problem periods and set up a variety of support networks over the long-term if more of our talented athletes are to be successful (Moore et al., 1998; Rowley, 1992). It appeared that a wide variety of formal and informal, sport and individual specific support networks have been crucial to the progression of many younger athletes, in order to help prepare them for and support them through key transitions (Csikszentmihalyi et al., 1993; Durand Bush, 2000; Durand-Bush & Salmela, 2002; Holt & Dunn 2004;

Macnamara, et al., 2006; Morgan & Giacobbi, 2006; Rees & Hardy, 2000; Wylleman, et al., 2004).

Indeed, social support has been found to be associated with successful TD and performance, with particular emphasis put on different types of support (Rees, Ingledew & Hardy, 1999). These included emotional support, esteem support, informational support and tangible support. Similarly, with individual coping mechanisms, integrated and often multidimensional uses occur and can change depending on the circumstances (Rees & Hardy, 2000), and can occur at any time, within or outwith any well defined transition. Furthermore, it has been highlighted that while provision for elite athletes in the UK appears to be good, it has been almost non-existent for developing athletes (Moore et al., 1998), hence resourcing, wide spread education and communication become all the more important.

3.3.3 Premise 3 – Emphasise Appropriate Development NOT Early Success

3.3.3.1 Performance is Different from Potential: The Need to Move Away from a Focus on Early Success

The characteristics of successful elite and developing athletes highlighted the need to take a long-term view to TID. For example, the characteristics of effective performance were very different from those factors associated with the potential to develop and become successful (Abbott & Collins, 2002; Abbott et al., 2002; Bailey & Morley, 2006; Bartmus, Neumann & DeMarees, 1987; Bloom, 1985; Regnier & Salmela, 1987). Therefore, what people attempt to identify and promote through development-focussed coaching needed to be based within a concept of talent that is defined as potential and not as current performance ability. Unfortunately, the many TID programmes throughout the world still appear to use performance measures as a

main indicator of talent at all levels, an approach already shown to be highly problematic and a major barrier to development (Abbott & Collins, 2002; Abbott et al., 2002).

To highlight this notion further, even extremely talented adults rarely start out as highly able children (Bloom, 1985), and "those who eventually become expert performers do not start out in a domain of expertise with an already exceptional level of performance as compared with their peers, when the benefits from earlier engagement in other related activities are considered" (Ericsson, 2003, p. 65-66). Leading on from this, while it is generally accepted that both genetics and the environment play a part in expertise development (Bailey & Morley, 2006), there is a considerable amount of research that highlighted how expertise and skills associated with high level performance are improved and developed through training (Bailey & Morley, 2006; Csikszentmihalyi et al 1993; Ericsson & Lehmann, 1996; Helson et al., 1998; Howe et al., 1998; Starkes, 2000). For example, Ward and Williams (2003) concluded that 'elite' footballers as young as eight had better skills due to extra opportunities rather than any genetic advantage. Such serendipitous early training can mask those with true potential, especially if large discrepancies exist between children's opportunities at early ages.

Due to the large amounts of change and progression made over a career, high ability is often not apparent until later, again masking our ability to identify talent at development stages (Bartmus, et al., 1987; Bloom, 1985; Howe et al., 1998; Simonton, 1999). Indeed, certain skills and knowledge important for later performance success, although can be trained and improved at early ages, do not become fully developed or explicitly apparent until later (Abertheny & Russell,

1987; Tenebaum, Sar-El, & Bar-Eli, 2000). For example, important memory skills can take up to 10 years to develop fully, but rarely show themselves before an individual reaches 16 years old (French & Mcpherson, 1999). As such, training that benefits long term preparation (e.g., fundamental development, non-domain specific deliberate play) would potentially not be as effective at producing short-term performance gains as intense sport specific practice (Cote & Hay, 2002), and as such the focus must be assessed carefully.

Further support suggested that the determinants of performance do not continually characterise success through the age groups (Abbott & Easson, 2002; Regnier & Salmela, 1987). In other words, skills that may be identified or promoted in development environments in order to achieve short-term success may become redundant a year later. For example, hard running and physical maturity may be key to rugby success at the age of 12 but, as athletes get older and size and strength factors balance out, mental factors such as decision-making and anticipation become more important for success (Abbott & Easson, 2002). Of course, certain skills are important for performance at many different levels (8-18), such as certain perceptual and cognitive skills (Ward & Williams, 2003), so it would be appropriate to identify what is key and develop these in as many youngsters as possible.

It seemed clear that in order to provide youngsters with the best chance of realising their potential in the longer term, TID programmes must be focussed on habits and skills that will be effective at later stages, together with those which enhance a youngster's ability to learn, develop, and progress successfully into the future. Ideally, such programmes will de-emphasise 'winning', identification and selection and stress appropriate development, whilst avoiding common mistakes such

as the over emphasis on factors solely associated with age specific success. Of course, we acknowledge that while age group success must not drive the aims of practice, it may still happen. After all, someone has to win! Indeed, it is important that this issue is not be confused with the desire to win and be the best, which is an important quality for development (e.g., Bloom, 1985), as is the ability to perform and succeed under pressure. However, the key message is that 'performance' needs to be clearly separated from 'potential' in both the requirements of identification and development priorities, and it is imperative that expectations, roles and understanding within each level of development are clear and unambiguous in order to provide the required coherent promotion of long-term development throughout a sporting system.

3.3.3.2 Stage Specific Development

It is convenient to use stage approaches to TD, not least because on a practical level there are progressive, and often age related, stages in the school system and sport pathways, In addition, research has produced a complementary stage model (Bloom, 1985; Cote & Hay, 2002; Durand-Bush & Salmela, 2002; Ericsson et al., 1993; Van Rossum, 2001) and market gaps have spawned more practical models (Stafford, 2005), all of which may help guide effective and practical solutions. The extent to which advice is explicitly and coherently promoted from such models is not clear. However, while it is important to have a good understanding and definition of what is required at different developmental stages, research highlights the individual, dynamic and unpredictable development process (e.g., Abbott et al., 2005; Bloom 1985; Simonton, 1999) and therefore systems must allow for the fact that there may not be set stages that any one individual may

progress through (Moore et al., 1998). General templates may help organise our programmes and help us understand the priority at any particular moment in time or stage of development for a particular individual, but prescriptive packages and plans must be avoided.

Hence, the information to follow attempts to provide understanding and awareness of important factors from which coaches, teachers, (and more importantly) specific sports, activity or school systems must consider before developing their programmes and pinpointing what must take priority at each level and why.

3.3.3.3 Fundamental Mental Skills

3.3.3.3.1 Emotional attachment. Mental skills are not confined to practical skills such as concentration or goal setting; this term also includes attitudes, emotions, motivations and desires. This underlying collection of mental skills is crucial for both participation and the pursuit of excellence in sport (indeed in almost any endeavour). It is well documented that, without developing a strong emotional attachment and intrinsic pleasure from taking part in a certain activity, one will not pursue it to a high level (Bloom, 1985). This was perhaps one reason why those who made it to the top tended to engage in more deliberate play and sport diversity between the ages of 7 and 12 than non experts (Cote, 1999; Cote & Hay, 2002), and were exposed to less pressure to 'win' (Cote, et al., 2006; Gilbert, Gilbert & Trudel, 2001a, b; Gould, et al., 2006; Hill & Hansen, 1988; Horn & Harris, 2002; Siegenthaler & Gonzalez, 1997). It would make sense that this be prioritised at early development stages, perhaps through fun and non-pressured environments. Indeed, Cote, et al. (2006) have shown that certain environments appear to be associated with better preparation for elite level sport development. Features of these environments

seem to promote intrinsic motivation, enjoyment, self efficacy, early success and recognition, provided social support, integration with older children, and lots of varied, unstructured play and practice through less competitive atmospheres. The community, parents, teachers and coaches, amongst others have a strong influence here.

3.3.3.3.2 Learning, development, performance and life skills. In addition to developing (often at early stages) a strong desire and positive attachment to pursue sport or activity at any level (e.g., health activity, sport club, elite level), mental skills that enabled an athlete to acquire and consolidate skills, in other words learn and develop, were essential (Abbott et al., 2002; Sternberg, 2000). Additionally, the young athlete must be motivated to put in the many hours of deliberate practise required to excel in any field (Bloom, 1985; Ericsson et al., 1993) and to be able to keep progressing when times are hard (Bloom, 1985; Sinclair & Orlick, 1993). Interestingly, many studies have shown that it is only psychological factors that can distinguish performance levels (Talbot-Honeck & Orlick, 1998), and staying power at an elite level (Durand-Bush & Salmela, 2002; Kreiner-Phillips & Orlick, 1993). This broad literature highlighted the importance of psychological factors as causative drivers of success, and supports the need to systematically incorporate such skills into all TDEs from early ages.

The broad scope of these skills relate to performance, lifestyle management, learning and development. Although, a definitive set of mental skills has yet to be agreed, research from a number of fields of study consistently produces similar factors (Bloom, 1985; Gould et al., 2002; Orlick & Partington, 1988). Crucially, research also suggested that these mental skills and attitudes can be systematically

developed and are not just innate qualities, whereby certain key behaviours or traits are underpinned by teachable skills. For example, learning autonomy is an important aspect of successful development, and has been shown to be underpinned by strategies such as adopting a meta-cognitive overview, planning, monitoring, self evaluation and a mixture of attitudes, such as curiosity, persistence and confidence (Freeman, 1995). Indeed, it is all of these mental skills which would help characterise someone with potential, and therefore help with the holistic process of identification and focus for development.

3.3.3.4 Fundamental Physical Skills

Particularly within a sport specific environment, a broad range of fundamental movement and decision-making skills also characterise children with potential because they underpin the development of the more sport specific skills required for future successful performance and involvement in more specialised activities (Beamer et al., 1999; Jess & Collins, 2003). Again, these basics are not innate qualities and they need to be developed systematically (Gallahue, 1982). However, unless a child has developed the generic fundamental skills by the age of 11 or 12, future sport specific success may be beyond reach (Moore et al., 1998). Furthermore, it has been shown that up to 45% of pre-elite athletes reach an elite level in a different sport so that, even in the case of elite sport, it would be sensible to develop a broad range of skills first. In line with this argument, several studies showed that early specialisation does not favour the development of elite athletes and, before adolescence, diverse sports participation is more important (Cote & Hay, 2002; Hill, 1993), perhaps acting as a foundation of mental and physical skills (Beamer et al., 1999; Cote, et al., 2006; Ericsson, 1998). Again this highlighted the

apparent advantage, and perhaps necessity, to develop a sound grounding in fundamental skills (cognitive and physical) in order to become successful in a specific domain, or for a physically active lifestyle (Abbott et al., 2002).

3.3.3.5 What Sport Specific Habits and Skills will be Effective at Later Stages? The Importance of Integration

The factors that are important at later stages are a sport specific concern. Studying the senior game and predicting any likely trends is very important in understanding what may be most usefully developed now. However, while it may be easy to identify effective habits, it may take time to teach them well, especially where poor habits, such as over-dribbling in hockey or raw power in rugby are often rewarded with success at younger ages. This tactic will quickly lose its effectiveness at higher levels however, when skills such as decision-making under pressure and fast accurate passing become key. Unfortunately, many young players may give up at this stage, de-motivated by the sudden drop in performance standard previously achieved by a well conditioned but now limiting skill (Blanksby, 1980).

Research highlighted that it would be sensible to incorporate a wide variety of cognitive, perceptual, and motor skills into training programmes (Janelle & Hillman, 2003), as many 'teachable' factors are important in distinguishing the best performers at later stages (Helsen & Starkes, 1999; Reilly, 2000; Simonton, 1999; Williams & Starkes & Ericsson, 2003; Ward & Williams, 2003; Williams & Hodges, 2004). For example, only an integration of anthropometric, physical, psychological and sport specific factors could distinguish senior footballers at elite and sub elite levels (Reilly, Williams, Nevill, & Franks, 2000), and many researchers have highlighted the diversity of necessary skills (e.g., Abbott & Collins, 2004; Bailey &

Morley, 2006; Durand-Bush & Salmela, 2002; Elferink-Gemser, Visscher, Lemmink & Mulder, 2004; Falk, Lidor, Lander, & Lang, 2004; Helsen & Starkes 1999; Williams & Reilly, 2000; Williams, 2000). As the hockey example highlighted, it is often only the integration of skills, such as decision-making and passing, which are effective at later stages. Therefore it is extremely important that habits and skills are formed in an interdisciplinary and integrated manner in order for them to be truly useful and transferable (Durand-Bush & Salmela, 2002; Wall & Cote, 2007). Indeed, the importance of interdisciplinary work is well documented within sport science research (Burwitz, Moore, & Wilkinson., 1994).

3.3.3.6 Balance

The concept of balance runs at a number of levels where a balanced skills base specifically relating to the depth and breadth of physical and mental skills, but also in terms of a broad range of factors such as nutrition, flexibility, strength, fundamental skills, mental skills, decision-making skills and so on need to be developed. At a different level, the ability to organise and balance one's lifestyle is also extremely important. Research indicated that stress is an accumulative process and comes from a variety of physical and psychological factors (Silva, 1990). As such, being able to balance one's life stresses and 'recover' physically and emotionally is extremely important in staying injury free, motivated, and developing and performing well (Durand-Bush & Salmela, 2002; Gould, Udry, Tuffey, & Loehr, 1996; Salmela & Moraes, 2003). Finally, the stress that retirement can cause to athletes, especially if it is enforced through injury, needs to be considered (Sinclair & Orlick, 1993). Indeed, such a transition has been shown to be smoother and more beneficial to future development and well being, if there are clear goals and skills

that can be utilised after an athletic career is over. Indeed, a high proportion of parents of high achieving athletes highlighted the importance that education held through development (Cote & Hay, 2002). Therefore, as part of a healthy training and performance career, education, life experience and/or personal development must play an ongoing role in preparation and as part of recovery and relaxation away from the sport.

3.3.3.7 Encourage Responsibility and Autonomy in Learning and Development and Promote Personal Relevance and Athlete Understanding

Within the development stage of progression (Bloom, 1985), effective environments have been shown to require an ethos of respect, discipline, independence and sacrifice, where teaching and learning become based around the systematic acquisition of skills through many hours of practice, where high levels of intrinsic motivation and commitment are required. Crucially, an increasing responsibility and autonomy from the learner is demanded (Bloom, 1985; Csikszentmihalyi et al., 1993; Salmela, 1996).

The necessity of taking responsibility for long term development is emphasised further in a broad range of relevant literature including motor and cognitive learning, and teacher and student approaches where vast differences between long and short-term development is explicit (Entwistle, 1987; Schmidt & Wrisberg, 2004). From the learner's point of view, long-term progression requires the development of a large, domain specific knowledge base through many hours of training (Ericsson & Charness, 1994), developing autonomy and taking responsibility for learning (Knowles, Holton, & Swanson, 1998), elaborating and making development personally relevant, organising new learning onto previous knowledge,

everyday experiences, long-term objectives, and utilising a variety of mental skills (Entwistle, 1987).

3.3.3.8 Develop Intrinsic Motivation and Personal Commitment to the Process

Motivation is absolutely paramount to successful development in any form of pursuit; without it there is no drive to learn, develop or succeed. Indeed, "most amateurs do not improve their performance only because they have reached (in their minds) an acceptable level" (Ericsson, 2003, p.63). Although there appeared to be different motivational requirements at various stages of development (Bloom, 1985; Van Rossum, 2001), key driving forces such as intrinsic motivation and self-determination are crucial at all levels. At the early stages, these factors occur in a variety of forms (e.g., the need to feel worthy and competent) and although most children withdraw from sport because of other interests, a significant minority leave due to their needs not being met, such as lack of fun, too much pressure or a dislike of the coach (Gould et al., 1982). However, at more serious pre-elite and elite levels, such as at stages two and three of Bloom's model, intrinsic motivation and self-determination emerge in different forms to meet the requirements of the achievement setting (Bloom, 1985).

While it is recognised that these forms of motivation and choice come from within, the coach environment can have a major impact on youngsters and therefore must promote these factors by setting the right motivational climate (Sproule, Wang, Morgan, McNeill, & McMorris, 2007). For example, providing opportunities for athletes to gain ownership of their development is shown to be effective in developing intrinsic motivation, and further research areas including goal

perspectives, goal setting theory, attributions and performance evaluation (cf. Hardy, Jones & Gould, 2000) suggest that different combinations of strategies are essential: the exact mix of which is both individual and context specific and can potentially change over time as an athlete develops and situations vary. Such research adds to the growing number of areas that highlighted the need to provide individual and ongoing support that incorporates a strong sense of mental skill training in any TDE.

Indeed, it must be recognised that mental skills, as with many aspects of TD, need to be integrated coherently with one another to be effective; for example Hardy et al. (2000) state that the "relationships that exist between such variables as perceived competence, goal orientation, outcome rewards, attributions, emotional reactions, self-efficacy and subsequent motivation" are extremely important (p.93). While the integration and teaching of mental skills is important (Durand-Bush & Salmela, 2002), it is also necessary to highlight that these skills and attitudes can be influenced to a large and powerful extent informally through the environment itself (Cote et al., 2006; Foster-Harrison, 1997), and appeared to include a strong sense of cultural value for the talent domain (Csikszentmihalyi et al., 1993; Gould et al., 2002).

3.3.4 Premise 4 - Individualised and Ongoing Development

3.3.4.1 Provide Opportunities and Fundamentals to as Many Youngsters as Possible

Through the empirical and theoretical literature presented earlier, it has been argued that we need to move away from early selection policies and an emphasis on winning at young ages, in part because it is so difficult to predict the ultimate level that someone can reach (e.g., Abbott & Collins 2004; Bartmus et al., 1987; Harre,

1982) and due to potential negative consequences (e.g., Gould et al., 1982). Through the same evidence base presented earlier, with the addition of the evidence presented on the importance of fundamental physical and mental skills, it became obvious that these skills need to be systematically developed in as many children as possible from an early age (e.g., Cote & Hay, 2002; Gallahue, 1982). Such opportunities for all, providing a foundation of quality physical and mental education, could be initiated successfully through the school system, supplemented by coherent sport and health initiatives. In turn, this could provide the coherence and consistency required to develop a physically active and talent rich culture, as can be seen in a recent Scottish initiative, the Developing the Potential of Young People through Sport (DPYPS) programme (Collins, Abbott, Sowerby, & Martindale, 2007). Furthermore, the education of important features of early development could usefully be delivered through the community (Cote et al., 2006).

3.3.4.2 Provide Flexible Systems to Allow for Performance and Physical Development Variation

Similarly, earlier sections highlighted the likelihood of performance and physical development variations throughout development. Indeed, empirical evidence shows the unstable nature of anthropometric such as height (Abbott & Collins, 2002) and general growth patterns (Ackland & Bloomfield, 1996), especially through adolescence. The implication is clear; "the identification of some positive characteristic in a pre-adolescent child ... does not guarantee that the characteristic will remain through-out the process of maturation toward the adult form" (Ackland & Bloomfield, 1996, p.57). Similarly, performance factors are also

unstable due to factors such as maturation and training effects (Abbott & Collins, 2002; Ward & Williams, 2003).

Furthermore, Simonton's (1999) model of TD highlighted talent as multi-dimensional, whereby a number of factors can contribute to the existence of talent within any domain. Talent and its development is dynamic and over time "infancy, adolescence and even adulthood will see the latent components undergoing various transformations" (Simonton, 1999, p.442). In other words, talent will develop and change over time in both adaptive and maladaptive ways, depending on certain innate and environmental factors. The implications of such a dynamic process are that systems must be flexible enough to allow for such variations. For example, good club structure can provide a wide range of opportunities at a variety of junior and senior age groups, within which one can cater for differing standards. This would allow movement in and out of the system without a full loss of resources and opportunities. Coherent coach education and philosophy would minimise this still further. If representative teams were de-emphasised until later ages, this would further leave the door of opportunity open for more for longer and allow a system of talent identification to take place over time through the club game for example (e.g., Bloom, 1985). Furthermore, given that high quality (as opposed to high quantity, Van Aken, 2005) and challenging competition experiences become a very important development tool once a certain stage is reached (Bloom, 1985; Cote 1999; Cote & Hay, 2002; Durand-Bush & Salmela, 2002) it would be sensible to give special consideration to the development of a system that can cater for such needs.

3.3.4.3 Identify, Prepare for, and Support Individuals through Key Transitions

It is apparent that development is extremely individualised and in turn, for effective practice, individuals have to be treated as such. It has already been presented that transitions, or periods of change, are key for future development, and during 'sensitive' periods young athletes may be more vulnerable to dropping out of sport or retiring early (Rowley, 1992). In fact, the variety of support available and the range of mental skills utilised by an individual is likely to determine how beneficial a transition may be, indeed different or additional attributes and skills may be required (Abbott et al., 2002; Durand-Bush & Salmela, 2002; Holt & Morley, 2004; Macnamara, et al., 2006; Schlossberg et al., 1995; Sinclair & Orlick, 1993; Wylleman, et al., 2004). This development could be the key to successful progression (Abbott et al., 2002; Sinclair & Orlick, 1993). However, this need for mental skills is worrying when you consider the large number of problem periods (Rowley, 1992), coupled with a lack of (albeit growing) interest in sport psychology that has been shown within the UK (Moore et al., 1998). UK research highlighted the need to identify and understand the nature of sport and individually specific problems and set up a variety of support networks, education and training over the long-term if more of our athletes are to be successful (Moore et al., 1998; Rowley, 1992), and while many issues may be generic and dealt with on a broad scale, other individualised circumstances need to be tackled on that basis.

3.3.4.4 Provide Regular Individual Goal Setting and Review Processes and Systematic Reinforcement Contingencies

Due to the dynamic, individualised nature of development (Abbott et al., 2005), and given that "no uniform *sport* performance ability exists: deficiencies in

one area of performance can be compensated for by a high level in others' (Bartmus et al., 1987 p.415), it is clear individual needs must be recognised (Russell, 1989) and it is imperative that youngsters are treated as individuals, and their needs are individually met as often as possible (Van Tassel-Baska, 2001). Regular goal setting, with purposeful feedback and review systems, in conjunction with informal and formal opportunities to communicate, are one method of ensuring effective individualised development (Cote & Fraser-Thomas, 2007; Durand-Bush & Salmela, 2002; Ericsson et al., 1993; Macphail & Kirk, 2006; Weirsma, 2000). While it is recognised that individualising practice is a big coaching commitment, and perhaps more suited to a professional set up, the effectiveness of such teaching and educational approaches are well documented (Ysseldyke & Christenson, 1987) and recent work has shown the importance of coach commitment to individualised attention for the eventual development of high-level talent (Bloom, 1985; Csikszentmihalyi et al., 1993; Gould et al., 2002). Furthermore, the individualised nature of many behaviour change interventions supports the importance of individualised practice especially when combined with contingent reinforcement strategies (Siedentop, 1978).

3.4 Part 2 - Summary and Guide For Effective TDEs

Whilst it is recognised that this review has a broad and diverse scope, the strength of the guidelines that follow lies in the consistency with which several key features re-appeared throughout the variety of literature presented. Accordingly, while these key ideas have been amalgamated and integrated to provide theoretically-based and empirically-supported guidelines for effective practice, they do not necessarily represent a finalised and validated factor structure. Within the guidelines,

a range of methods has been presented to provide a practical element to the model. Importantly, while certain methods have been associated with specific key messages, the guidelines present an integrated and dynamic process; where all methods and key elements interact with one another and therefore the need for systematic development is clear. The guidelines, presented in Figure 3.1., offers an applied synthesis of the varied literature reviewed this far.

The importance of the development of these guidelines is highlighted through evidence inherent in current work in this area (Falk et al., 2004) and through the exemplars of current practice to follow. Firstly and positively, Falk et al. (2004) explicitly requested and supported the need for a model of TID by highlighting that, at present, there is a lack of clear-cut guidance for the development and operation of TID schemes. They also acknowledged some of the flaws in trying to identify and select those youngsters with potential from performance criteria, for instance, the masking effects of different maturity levels and previous practice. Importantly, they also make pertinent suggestions regarding TD, such as the need to teach skills within an integrated decision-making context.

However, in contradiction to the advice which emerges from both their stated position and this review, Falk et al. (2004) went on to conduct a talent identification methodology based on early performance (at age 14) as an indicator of eventual achievement. The point is, yet again, that a coherent approach to TID is hard to find. Inconsistency is apparent both between and even within approaches, and this recently published and peer-reviewed paper shows that agreement with the guidelines offered in this paper is far from universal.

Reflecting this position, as well as providing an empirically supported set of guidelines, this review in part, also aimed to provide the foundation on which research and practice can move away from attempting to identify performance correlates of potential and focus more explicitly on the need to explore the individual and environmental factors which are causative of effective development and future success, for example, the characteristics of excellence (Abbott & Collins, 2002; Bloom, 1985; Gould et al., 2002; Orlick & Partington, 1988) and the coaching environment (Bloom, 1985; Gould et al., 2002), and significant others (e.g., Gould et al., 2002). Bloom's (1985) influential work in this field supports this contention, "rather than continuing to search for the definition and identification of the talented, it would be more productive to look at the dynamic interaction between individuals and their opportunities, to take a long term developmental approach to talented especially creative behaviour" (p.533).

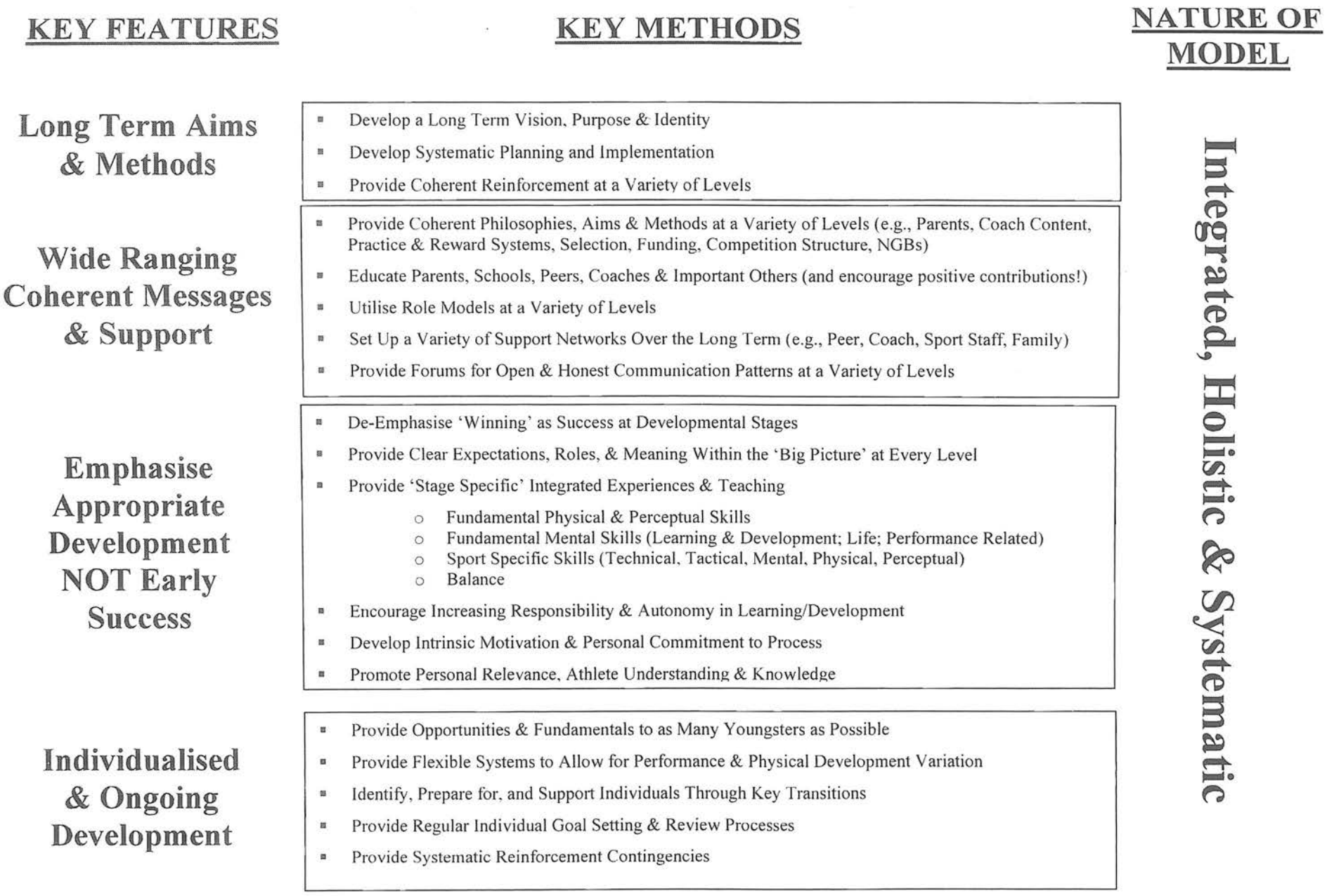

Figure 3.1. Outline of effective TID procedures emerging from the literature

3.5 Part Three: A Comparison of Current Practice with the Key Messages from the Literature

Further support for the need and importance to develop such explicit guidelines is presented in this section. Through the consideration of exemplars of current practice from around the world, it is clear that, while the guidelines are not 'new', in practice there are many contradictions to their suggestions. Indeed, as has been presented in chapter 2, while many millions of pounds have supported the development of the World Class Performance Programmes in the UK, explicit guidelines regarding how talent is identified and developed are difficult to find. Guidelines that are apparent, such as the much-publicised work of Balyi (Stafford, 2005) present some sensible, clear requirements of development. However, as chapter 2 highlighted, how this developmental process is achieved or why it is done in this particular manner rather than another receives significantly less attention and crucially lacks empirical support. Indeed, as this review supports, it appears much more is already known about the hows, whys and whats of effective TID processes than currently utilised models may acknowledge, or even employ. Accordingly, this final section highlighted the contradiction that is apparent between much current worldwide practice and the recommendations emerging from this review of literature.

3.5.1 Long-Term Coherent Messages and Support

Coherent and consistent practice appeared to be the best way to build effectively towards aims, in this case long-term aims. However, evidence from a variety of areas showed that long-term agendas are not coherently reinforced across levels. For example, early selection is often highly valued and important

opportunities are gained from being successful in the short-term, inevitably influencing coaches to prioritise short-term development methods and selecting those who can perform well in the present at the expense of others (who perhaps have more long-term potential). The explicit nature of these processes is also important. For example, a typical funding policy is represented through Bristol City Council's Individual Performance Athlete Sport Grant programme where the aims are to help to develop local sporting performance and excellence. However, the criteria for successful applicants revolved around current demonstration of high level of achievement and performance standards through national age group ranking or membership of a national squad, and give no allowance for those with 'potential' but as yet unrealised performance results. Thus, funding is often another mechanism that appeared to reinforce short-term age group success over long-term development. Finally, coach reward systems that recognised success purely on winning at age group levels also reinforce a short-term agenda. Examples of this can be seen through such prestigious awards as the United States Olympic Committee (USOC) coach recognition programme (2002) where coaches are publicly recognised for high achievement, defined by winning percentages, without any reference to the coach's ability to help individual athletes progress through the system to senior level, as measured for example by eventual success of the athletes coached.

As we have seen, assessment and reward are extremely effective motivators for practice, especially where recognition will inevitably lead to career development. Furthermore, the message this provided poor direction to less experienced coaches and may reinforce poor practice, such as early selection and emphasis on winning, potentially at the expense of inclusion and long-term development for all. At

present, systematic approaches to counter this obvious and unhealthy bias in the implicit reward structures for coaching are missing.

3.5.2 Emphasis on Appropriate Development and Not Early Success

Unfortunately, there appeared to be a widespread rush to identify and select children into specific sports from an early age (Kozel, 1996). Of course, the focus on identification of talent at an early stage is likely to result in sporadic development opportunities for individuals. For example, research shows that the natural fluctuation of performance standards and development as children grow and experience different opportunities will significantly influence selection and de-selection, especially where short-term success is valued. Indeed, many youngsters with no long-term potential will receive valuable opportunities at the expense of others. For example, in the German Tennis Federation (DTB, 1992; a policy still in existence today), children as young as six are selected from mini tournaments and motor ability tests for sport specific development training. In fact, internal inconsistency is yet again apparent as the DTB also lay down the need for 90% generic movement skills and 10% competition until the age of 12.

Furthermore, throughout the age levels, tournament performance appeared to be the key for gaining training opportunities, funding and resources. Coach recognition systems compound this focus on early performance levels by rewarding successful coaching based on annual league results and ranking positions in age groups as young as under eight. The variety of pressures for short-term success is apparent in many other sports systems throughout the world, although substantial theoretical and empirical evidence suggests this is likely to significantly damage efforts to increase participation and develop talent long-term.

Although, recognition of the educational need to develop fundamental movement skills at a young age is growing (Moore et al., 1998; Stafford, 2005), there is little evidence to suggest that either sport specific pathways or school education systems provide such a service. Indeed, in recent years, problems appear to occur even where programmes do specifically aim to develop generic skills. For example, McClymont (1999) suggested a model of TID for New Zealand where generic training is provided only after selection, somewhat contrary to the rationale behind it in the first place. In other words (if somewhat circular), it is extremely difficult to identify potential in a youngster who has never received training in the skills tested to identify potential! Furthermore, as generic skills underpin the development of more sport-specific skills it appears sensible to develop those first in as many children as possible before attempting to identify those who may have potential.

Additionally, given the importance of mental skills for performance and development, there is a surprising lack of emphasis and guidance within development programmes. While some more proactive bodies such as British Swimming (Gordon, 2004) have started this process by including psychology at an introductory level for swimmers between the age of 11 and 18, the issue of non-participation through early adolescence (Parrack, 2002) shows clearly that much more needs to be done. Unfortunately, some governing bodies combine this more holistic developmental approach with early TI programmes based on limb measurement and body mass index (BMI), offering further evidence for a lack of coherence in methods and philosophies used.

3.5.3 Integrated, Holistic and Systematic Approach

Even with an increasing recognition of the need to integrate many aspects of training, the lack of coherence and practical applicability often appears to create problems: a simplistic example of how some attempts to individualise and provide systematic approaches have fallen short. For example, the Scottish Hockey Union (2004) utilise observation sheets in order to monitor individual progression of players in a variety of important factors, including cognitive components such as decision-making. However, the criteria for observation are not explicit and therefore the test-retest and inter-rater reliability would inevitably be rather low. Furthermore, decision-making is not addressed at all within the accompanying hockey skills record cards, nor are any of the skills that are tested integrated with decision-making. Although, it is understandable that simplistic tick box skills assessment make many coaches feel secure, given the extent to which assessment (and subsequently selection) drives motivation and development, and the key importance of decision making to invasion games, these tools only appeared to serve in reinforcing the uni-dimensional and compartmentalised methods of skill learning that sport should be trying to eliminate. It appeared crucial that more coherent and systematic efforts to target and reinforce key issues of integration need to be made at a variety of levels. Some attempts are being made to develop coach education through links with top universities; however technique development still dominates many coach education programmes.

3.5.4 Individualised, Ongoing, and Systematic Development

While issues such as flexible systems and individual development are highlighted as key concerns, at best, individualisation tends to be developed only at the advanced stages. For example, the British Squash Prospects Management

programme (Milton, 1996) provided an holistic and individualised package of support to players who have decided to make squash their living. However methods of maximising individualised training at all levels needs to be further explored, for example, through programmes such as sportscotland's Developing the Potential of Young People in Sport project (Collins et al., 2007). Flexibility in development systems appears to be particularly difficult when there is a large gap between the quality of experiences between club and select squads. This gulf potentially makes it extremely difficult for a developing youngster to catch-up once they are out of the loop.

3.6 Conclusion

The aim of this broad review of literature was to provide some clear evidence based and integrated themes that are associated with effective development processes, guide future research and inspire debate. The final section of this chapter has provided a flavour of how many aspects of current practice from all over the world contrast with findings within the literature, and as such further justifies the need for its development. This initial insight into the nature and contrast between current practice and evidence driven concepts of effective TD supports the need for future research to investigate elite coaches and developing athlete perceptions and experiences of effective TD. In particular, a triangulation of data based on past research (i.e., chapter 3) and insight into effective practice from both a coach and athlete perspective could inform current practice in a powerful way, providing the basis for the development of guidelines for TD at a variety of levels. Therefore, chapters 4 and 5 go on to examine these necessary components with the aim to generate a more comprehensive picture within the UK.

CHAPTER 4 – EFFECTIVE TALENT DEVELOPMENT: THE ELITE COACH PERSPECTIVE IN UK SPORT

4.1 Introduction

Chapter 3 presented some clear guidelines that promote effective TDEs. These were based from available and relevant past research, and as such provided both procedural and declarative knowledge which can be applied to practice and research. The need for this development was outlined through chapters 1 and 2, but is also inherently supported in the final part of chapter 3, where many examples of current practice and research alike show disparity, or at least do not consistently apply key messages from the evidence base and philosophy presented. While the breadth and depth of the empirical work that underpins these 'characteristics of good practice' supports their use as a structure, the importance of context specific and up-to-date research in this area has already been shown. As such, it is clear that more investigations must take place in order to further validate and develop the key features within appropriate contexts and with suitable populations.

It is important to develop these guidelines in a thorough, scientific and triangulated way in order to collate a range of evidence and context specific information that can validate guidance for practice effectively. As such, for the next part of this thesis, it was crucial to identify current, and proven, expert talent developers within the UK context and investigate the nature of their practice and the rationale that underpins it. Such triangulation offered a mechanism of founding the credibility of the guidelines through expert opinion as well as empirical findings. Accordingly, this chapter had two main purposes. The first was to examine expert coaches' perceptions of the goals and systems required in order to implement

effective TDEs within a British context (note, these perceptions represented opinion of what was required but did not necessarily typify current practice). Indeed, the generic nature of effective TD procedures required examination; as such through inductive analysis this investigation examined the goals, nature and systems of 16 coaches with significant expertise in TD across 13 different sports providing an assessment of the coherence of key features across sports. Subsequently, the second purpose of the study was to examine deductively the extent to which expert opinion was consistent with the model of guidance apparent from the literature (See Figure 3.1 and chapter 3 for more information), with the aim of providing a more substantial evidence base for the delivery of best practice. Indeed, if clear and consistent results emerged, guidelines for good practice may be more usefully developed and disseminated, at least within the context of the investigation (Peshkin, 1993).

4.2 Method

4.2.1 Participants

In order to secure an accurate picture of best practice, it was essential to recruit a representative sample that could justifiably be considered expert. Accordingly, the sample consisted of 16 development coaches from a variety of sports including athletics, canoeing, curling, cycling, equestrian, (2) soccer, hockey, judo, netball, (3) rugby, shooting, swimming, and triathlon. They were identified as expert 'talent developers' through the application of four criteria.

Firstly, the coach development staff at UK Sport recommended the coaches as exemplars of good practice at developmental and elite levels. At the time of the investigation, the Coaching Support Team were focused on the evaluation of high-level coaching nationwide, as a precursor to the development of structured support

for National Governing Bodies. The audit process completed as a part of this evaluation offered them an informed perspective across sports.

Second and subsequently, this view was confirmed through interviews with other elite-level coaches and senior coaching directors within each of the sports represented, who were independently (i.e., blind to the UK Sport nominations) asked to provide a list of suitable candidates. In all cases, this input supported the UK Sport view.

Thirdly, the nominees' standard of work and criticality had already been recognised and rewarded within their sports through their appointment as mentors, acting as designated role models for effective practice within their respective sport's coach development structure.

Finally, all participants had a record of success in the development (from a maximum age of 16) to elite status of athletes in their respective sport; additionally, and in order to confirm their current status, all were currently working with elite and/or development athletes.

Demographically, 14 of the coaches were male and two were female; 12 were British, two were Australasian and two were European. Ten of the coaches worked with males and females, one worked with females only and five solely with males. All coaches had at least 10 years of coaching experience and had represented at high levels of performance as athletes themselves.

4.2.2 Design

A qualitative methodology was selected to gain an in depth understanding of the experiential knowledge of TD experts. The qualitative process identifies that the "main goal is to reduce the amount of data and obtain a unified picture of the

phenomena under study" (Cote, et al., 1993, p.130). In order to maximize the chances of gaining a complete picture of the nature of effective TD, a semi-structured interview was developed, consisting of nine open-ended questions, carefully structured in an attempt to elicit truly open-ended responses (Patton, 1990). The questions can be seen in Figure 4.1.

1. Could you give me an overview of what you do when you coach development athletes?
2. How does this contrast to what you do when you coach elite athletes?
3. What factors do you think characterise someone who has the potential to become elite?
4. What are the stages that someone has to go through to progress from novice to elite in your sport?
5. What do you do at each of the stages?
6. Could you tell me about the complexity of what you are trying to do at each stage?
7. Could you tell me about your use of 'others' within each stage?

Figure 4.1. Interview questions

Pilot interviews were conducted with three international level coaches (triathlon, rugby, basketball). Feedback obtained from these interviewees, in addition to critical appraisal by the investigators, was used to evaluate and refine the interview guide. This evaluation process, in addition to recommendations from Patton (1990), was also used to help guide the interviewers away from biasing coaches' responses by ensuring the use of a neutral, impartial stance when probing

participant responses and also to maximise rapport, comfort, recall and open responses (cf. Backstrom & Hursch-Ceasar, 1981).

4.2.3 Procedures

Once the expert status of the coaches had been identified, they were recruited by personal contact. After informing them of the nature of the investigation, and providing assurances of anonymity, all agreed to take part. The main interview questions were sent to the coaches before the interview in order to allow them to familiarise themselves with the types of questions that would be asked. All interviews lasted approximately 120 minutes and were tape recorded for later transcription. In order to ensure a full investigation into their perceptions of the nature of effective TD, each coach was asked an identical sequence of questions (as outlined above); however, in order to gain an in depth and full understanding of the meaning of all responses, clarification and probing was used as required for each individual coach (Patton, 1990).

4.2.4 Data Analysis

Analysis followed the processes outlined in Edwards, Kingston, Hardy, & Gould (2002), and utilised both inductive and deductive analysis. The initial inductive approach utilised hierarchical content analysis, as outlined clearly by Cote et al. (1993) through three stages, 1) coding experience; 2) inductive inference and; 3) similarity processes. Themes and categories that emerged from the data (Patton, 1990) were represented and supported by quotes in the results section (Cohn, 1991) and are presented in Tables 4.1.; 4.2. and 4.3.

The subsequent, deductive analysis used a pre-determined set of themes and categories to organise the data (Patton, 1990). Specifically, within this study the

deductive analysis was used to assess the extent to which the views gained supported the theoretically and empirically based model that emerged from the literature (see Figure 3.1.). It was recognised that there are difficulties in generalising data from any qualitative research, indeed, "it is impossible to generalise in a scientific sense at all" (Guba, 1978, p.68), even when a diversity of participants are covered; in this case, a variety of different sports. However, it is also important that "the evaluator should do what he can to establish generalisability of his findings" (Guba, 1978, p.70), and as such, it was deemed useful to examine the extent to which the findings supported more widely developed TDE criteria, as emerging from the literature. Perhaps, if consistent support was clearly apparent, the user generalisability of the emerging factors would be enhanced somewhat, at least in the sense of highlighting the need to critically consider their value within any TDE (Peshkin, 1993).

4.2.5 Establishing Trustworthiness

Several steps were taken to establish trustworthiness. First, steps were taken to maximise the levels of open-ended responses (as outlined above), and two researchers carried out the interviews in order to reduce the personal bias that a single researcher may bring. The two interviewers both took part in the pilot study with both passive and active roles. This provided opportunity for critical discussion and establishment of equivalence of interview style between the two interviewers. Second, a report of the results was sent back to each coach to establish credibility of the findings through stakeholder checks (cf. Patton, 1990), from which no one reported any required changes. Thirdly, two different researchers carried out reliability checks (Scanlan, Ravizza, & Stein, 1989). This involved raw data quotes being coded into raw data themes in two (approximately 10%) of the interviews,

followed by matching all the second dimensions to their third dimension themes and matching all the third dimension themes to the general dimension themes. Finally, the results of the reliability and validity checks were discussed by all four researchers, which acted to finalise details and the emergence of the appropriate themes.

4.2.6 Deductive Model and Theory Examination

In accordance with procedures used by Edwards et al. (2002), based on the transcripts and the understanding gained from the process of the qualitative analysis, two of the researchers deductively analysed the data in direct consideration of the five key characteristics of effective TD practice that emerge from current theory and empirical research (see Figure 3.1). The data from the 16 coaches were individually analysed, and the researchers assessed the extent to which they provided no support, some support or support for the model (see Table 4.5). 'No support' was defined as no evidence of the importance of the theme; 'Some support' was defined as evidence supporting the importance of the theme and use of less than 50% of methods, and finally; 'Support' was defined as evidence supporting the importance of theme and over 50% of methods.

4.3 Results

The themes and general dimensions that emerged from the inductive hierarchical content analysis are presented in tables 4.1–4.4. They are also inherent throughout this section (Cohn, 1991) where quotes have been used to enable the reader to gain some appreciation of the context in which the themes emerged from the data.

Table 4.1

Clarity and Consistency of Philosophy, Objectives and Methodology

Raw Data Codes	Sub Theme 1	Sub Theme 2	General Dimension
	Getting players to and winning at senior level	Coherent long term aims and methods	Clarity and consistency of philosophy, objectives, and methodology
	Preparing 'kids' for the rest of their lives		
	Developing 'kids' to be good enough to join a club/ stay involved in sports		
	Importance of school/club/country coherent aims and messages		
	Players understand standards expected of them and aims at their level are clear and relevant to LT achievement	Clear expectations and links to senior Level	
	Players understand standards eventually required		
	Player contact and involvement with senior players and coaching staff		
	Coherent LT aims throughout the system		
	Coaches communicate and integrate at all levels		
Parents are influential	Club role in education and 'use' of parents	Importance of education, integration & use of 'outside' influences	
Important to educate and 'use' parents			
Teachers/school environment influential	Club role in education and 'use' of teachers		
Important fundamentals (skills & attitudes) are taught correctly			
Important to educate and 'use' teachers and schools			
	Club role in education, integration and communication between a variety of coaches		
	Integration with a wide variety support staff – 'Team of Support'		
	Importance of peer group influence		
	Flexibility and support from athlete's work or education demands		

Table 4.2

Systems Facilitating Promotion of Player Development

Raw Data Codes	Sub Theme 1	Sub Theme 2	General Dimension
	Individualised improvement key	Promote individualised programmes	Systems facilitating promotion of player development
Systematic analysis of strength/weaknesses & needs	Individual differences within needs, strengths/weaknesses & development programme		
Individual differences in development rate			
	Promote player self awareness	Developing player ownership, autonomy and self motivation	
	Promote player ownership		
	Promote independent learning		
	Promote self responsibility		
	Promote and check player understanding		
		Ongoing review and goal setting for player improvement	
Practical set up must allow for informal meetings/interactions	Informal interactions are non threatening – more opportunities to find out about and help athletes	Importance of 'informal' player/coach interactions & set up	
Good coach/athlete rapport/relationship is essential			
	Creates open honest two way communication		
	Overall balanced development within sport	Balance	
	Balance lifestyle		
	Target emotional and physical recovery		
	Age group teams too selective too early	De-emphasise age group success	
	Create environment where all have opportunity to develop		
	Individual differences in 'development' - must focus on individual development not 'squad/team performance'		
	Coach rewards based on bringing players through not win loss record		
	Parents	Utilise the effects of role models	
	Peers		
	Teachers/schools		
	Senior performers		
	Peers at a slightly advanced stage of development		
	Coaches as role models		
Video review	Skills reinforced through a variety of means	Skills must be integrated, systematically taught and reinforced	
Schools/teachers			
Parents			
Variety of coaches & support staff			
Role models			
Peers			
Education	Skills must be taught and practised systematically		
Practical work			
Organised and integrated			

Table 4.3
Importance of Ongoing TID and Opportunities

Raw Data Codes	Sub Theme 1a	Sub Theme 1b	Sub Theme 2	General Dimension
	Maturational differences	Identifying potential/talent in youngsters is problematic	Athlete development is individualised & unpredictable	Importance of ongoing TID & opportunities
	Youngsters have different training experiences			
	Unpredictability in development and later success			
	Early selection/deselecting puts youngsters off sport			
	Identification is difficult - Its importance requires the best coaches to have to do it			
	Can be positive or negative	Transitions - Issues regarding potential problems periods		
	Often v important lessons for athletes to learn			
	Most athletes will go through hard times			
	Mental toughness key to successfully progress			
	Individual differences - pressures effect athletes differently			
	Support network important			
'Big gap' to the senior level	Variety of generic & individualised potential problem periods			
Poor coherence between different clubs/international				
Early selection/de-selection				
Athlete independence				
Increased commitment				
University – peer pressure				
Finance				
Work/educational pressures				
Poor skills base hindering progression				
Other 'life' pressures				
Slow progress				
	Development experience is required before potential can be identified	Identify potential over time	Flexible, open & ongoing opportunities	
	Potential/talent emerges over time			
	Late developers exist	Provide breadth & depth of opportunities		
	Variations in 'progress' exist			
Psychological – educational & practical development (training & competition)	Sport specific skills	Wide range of skills that need to be promoted through development	Skills that must be promoted in development environment	
Technical & decision making – educational & practical development				
Physical – educational & practical development				
Tactical – educational & practical development				
Other relevant 'sciences' or skills				
Develop enjoyment/love for game	Fundamental and generic skills			
Develop fundamental skills correctly whilst allowing natural talent to come through				
Variety of sports that teach transferable skills - do not specialise too early				
Develop values, character & balance				
Balance	Life skills			
Self responsibility & values				
Variety of relevant skills as appropriate				
	Love for the game	Generic qualities of young players with potential		
	Ability to adapt to life, competition or training pressures			
	Fundamental skills & coordination			
	Ability to improve and develop			
	Mental desire & attitude to improve and succeed			
	Individual differences in mixture of			

Table 4.4

Current UK Problems with TD & Coach Characteristics

Raw Data Codes	Sub Theme 1	Sub Theme 2	General Dimension
		Incoherent aims at different development levels	Current UK problems with TD
		Poor communications systems	
		Funding	
		Lack of early fundamental skills & quality coaching	
		Culture – not conducive to hard work, self responsibility and self improvement	
		University	
		No clear long term development pathway	
	Practice set up/organisation	Coach must be creative & adaptable to maximise learning	Coach Characteristics
	Equipment to allow technique development		
	Coaching methods to suit age/individuals		
		Be able to control the controllables	
		High standards/disciplined	
		Be able to 'act' to adapt to situations as required	
	Patient	Good people skills	
	Empathetic		
	Ability to be realistic and inspire people		
	Good use of humour		
	Respect athletes as people		
	Good listener		
		Passionate and open to learning	
	Make the complex simple	Must integrate knowledge and experience to provide integrated 'simple' solution	
	Ability to be clear and concise		
	Be able to make hard decisions		
	Decisions based on experience and good broad knowledge base		

4.3.1 Clarity and Consistency of Philosophy, Objectives and Methodology

4.3.1.1 Coherent Long-term Aims and Methods

It was clear from the data that long-term aims must be consistently prioritised throughout the development system in order to prepare explicitly for senior success. In fact, in many cases junior performance levels appeared quite unrelated to those at the senior stage; a factor which participants recognised through their respective

system. For example, one coach highlighted the need to select later and change the philosophy and aims of age group teams.

> "I'm a successful 'age group' coach, I've won all my 'sport' games. Well, great. And the best thing to do is just to sweep it all away and say no, we'll leave our selection later...what we're really wanting to do is select from our senior club sides, and junior internationals; by junior I mean under 21."
>
> Team Sport Coach

Another coach highlighted the issue around long term development and burnout of age group athletes who are pushed too hard too early.

> "A lot of former world junior champions don't stay in the sport. They don't make it or they stay in the sport but they don't seem to go on to greater things. There are exceptions of course but again looking at the 'Aussie' model, we think they tend to push them too hard too soon and basically burn them out. There are other reasons so we try not to take a softly softly approach but we try to take a more long term approach to keep them in the sport longer."
>
> Individual Sport Coach

A systematic process designed to progress athletes step by step was highlighted, where pressure to win at each stage was detrimental to long-term development. For example, those with potential can be missed and deprived of opportunities due to a lack of current performance results, together with coaching aims and methods which lack long-term developmental focus. For example, the coach below highlighted a selection situation in which different agendas appeared to be disrupting the system's coherence in terms of long term aims and provision of opportunity to athletes.

> "I watched the trials last year for the under 13s. They picked the particular mode of players it wasn't close to what I would have picked. And I have international experience, ...I'm not saying I would disagree with them in terms of getting the result that year, but I would have disagreed with it in terms of long-term development."
>
> Team Sport Coach

The quote below presented the idea that any coaching at one level must have a usefulness and relevance for the highest level of performance, and help a youngster develop and 'survive' successfully if they progress to the next level up.

> "The most important principle is that anything that I teach them has to work when they play senior international 'team sport'...what you do is you furnish them with the techniques and the decision making powers to be able to survive for the next level up."
>
> Team Sport Coach

An overseas coach working in the UK presented a situation below where the goals of training camps and competitions at age group level needs an explicit focus on individuals' long term goals and the development of those through the provision of appropriate experiences, not about an 'age group team results'.

> "We sent some under-17's to Australia ...they were sent there not as a team at all, they were just sent there as a bunch of players who went there to have an experience. Now that's just totally unheard of in the England stuff, so there's some massive changes (needed) within 'sport'."
>
> Team Sport Coach

Finally, it was appreciated that not everyone can make it to the top; in line with this a strong educational ethos was also prevalent. This was highlighted below showing the holistic view of one top level coach.

> "When dealing with a young person you are laying the foundation both physically and mentally for them to take on the world for the rest of their life."
>
> Individual Sport Coach

Indeed, the quote below highlighted the inclusive and balanced view of development that is required as part of the development of talent per se.

> "We look to produce a senior international player if they have the ability. If not, the aim and objective is to get them to be competent enough that they can join a club, the senior part of a club, and enjoy the 'sport' for the rest of their life, And that's just as worthy an aim."
>
> Team Sport Coach

4.3.1.2 Clear Expectations and Links to the Senior Level

For a long-term agenda to be successful, it was reported that those involved in the development process needed clear expectations and understanding of the dynamic nature of TD. For example, age group squad selection is not an automatic ticket to senior status, athletes may move in and out of squads and late developers have opportunity to become successful. This required careful management of expectations and relationships.

> "We need to be very direct and say that we do not want to be selecting players, I don't mind them being identified and given training but it shouldn't be a situation where other people can't come into that group as they become good enough. But getting people into that group late, they're entering a very threatening environment to people already established and the psychological handling of that needs to be spot on."
>
> Team Sport Coach

The coach below highlighted the importance of recognising when athletes are ready to be given an opportunity or experience at a higher level and the extent to which movement regularly occurs.

> "There's an acceptance that, well I hope there is now, there wasn't before, but my belief about squads is that about half of them will carry on next year. About a quarter to a third will drop out for whatever reason, and then there's another group that have just come in that are just starting the process...and some players will go from the third squad straight up to the top squad, and that's happened. And it's being able to recognise when they're ready."
>
> Team Sport Coach

Again, the extent to which athletes expectations need to be managed so they understand what to expect is very important.

> "The fact that they get in the nationally identified programme, it starts to become like, 'I've got in this now, and I'm just going to keep stepping up until I get to the national side'. And that's why that way that you set them up becomes very, very important, that everybody knows that you will only be in here as long as you're improving and the opportunity's there. And some day you might drop out of it, you could come back into it, and it's very fluid. If it's set up like that it's very good."
>
> Team Sport Coach

Furthermore, this openness was seen to provide realistic expectations, standards and goals for all involved, including direction and attitude for long-term development. However, this message must be reinforced, through for example appropriate coach reward systems.

> "You'll not stop that (praise for winning age group competitions), but the thing to do is to make sure that either that the system doesn't exist which is the first thing I would advise, but if you insist on the system being in place, then what you have to do is you have to track some of the players through and give praise to those county managers who actually produce the junior players."
>
> Team Sport Coach

4.3.1.3 Importance of Education, Integration and Use of Outside Influences

The data suggested that it was important to educate a variety of people to ensure that every influence is coherent. This included many people such as parents, coaches, peer groups, other role models, teachers, schools and society as a whole.

> "We need to ensure that the other people who are working with them are providing what's required, which is difficult. Kids are at school and they're not getting either the 'sport' training or the values or the home environment's no good."
>
> Individual Sport Coach

This was apparent in sports where a young athlete may have more than one coach, which could easily be the case through school, club and representative teams.

> "The biggest single problem I have as development coach is the kids have three or four different people talking to them about their game and as a result it leads to a lot of confusion. They become more skilful at doing the right thing for a coach that's stood in front of them than actually improving. And that is because the whole system is disjointed, split between school and club, split between international, divisional county club and school. A player could play conceivably at every one of those levels."
>
> Team Sport Coach

Indeed, the importance of parents and home life are perhaps underestimated, where a large proportion of those youngsters who make it tended to have a good home life and support.

> "One of the things that is very obvious in looking at young players is that 90% of the time the ones that make it through have got good solid advice at home. Because whether we like it or not, as coaches we see them for four or five hours a week, the parents see them every evening."
>
> Individual Sport Coach

It was therefore very important to spend time educating and disseminating knowledge to these people or organisations that have significant influence of the athletes' lives.

> "Once again it's the education that we've got through to the teachers, to the parents and we need to get it through to the coaches and the youngsters."
>
> Team Sport Coach

The lack of integration of coaches throughout the systems in place also was highlighted as potentially problematic due to the inconsistency and lack of required reinforcement of development.

> "They took the coaches out of the club system and in taking the coaches out of the club system it meant as a regional coach you did a one-off development session with a player. But when it came to the weekend, that work wasn't then reinforced."
>
> Team Sport Coach

Finding systematic ways of influencing and utilising as many people as possible was also considered important, and participants offered a variety of methods including formal education days, informal contact, large education initiatives, practical coaching education, websites, booklets, use of peers and role models, positive involvement of influential people (e.g., parents), and integration of coach practice and support staff to allow cross over of information and ideas. This was supported below by an example of a coach involving a parent in training.

> "When they went to play the game again I brought him over and said, 'I'm going to get your dad on the Sunday to do a count of how many times you get on the ball, and we're going to keep a score, your dad's going to start tonight. He's going to see in this game how many touches you get.' And he was fine, he was much better."
>
> Team Sport Coach

Communication between coaches was just as important, even within the same club / development system.

> "We are always discussing our players, right the way down to the elevens and twelves and when we go to a game, or when we go somewhere away, what we do, or we sit in the office. Because we all take teams you see. I take the under-14 team, X takes the under-16s team and the under-15s, and Y takes the under-12s and we've got players who take teams as well. So we all take teams, we all know the other kids as well."
>
> Team Sport Coach

Indeed, education didn't have to be a formal or time consuming process. The example below showed that 'a quiet word here or there' can facilitate the process.

> "You need to educate the parents, you need to get them in and you need to talk to them about the sort of factors where they're gonna raise in their heads...have a quiet informal chat on the side of the pitch. And parents can then hint to their kids about what you're looking for and that just helps the process."
>
> Team Sport Coach

One coach highlighted below the impact that quality school systems can have on development of a wide variety of youngsters, hence the importance of disseminating knowledge where necessary.

> "For me, the best way to do it is the way I came through the system, which is good schools, good PE teachers, letting you have a go at a lot of sports and giving you the opportunity to go where you need to go to progress, be it a club or whatever, but it all starts with the schools."
>
> Team Sport Coach

Indeed, even those people who were not necessarily involved directly in sport can have a valuable impact on a young sports person's development. Situations where this can happen should be facilitated and again knowledge disseminated.

> "I think the advantage of the school over the club situation and producing young players is that they come across other very experienced and talented staff who teach them all sorts of other qualities...talented people who will teach them all a number of things about life and living, take them on trips, do this, do that."
>
> Team Sport Coach

4.3.2 Systems Facilitating Promotion of Player Development

4.3.2.1 Individual Programs

A simple, but key and oft stated concept was the need for individualised development. This was important throughout the process, from needs analysis to development programmes. Due to the individualised nature of development, every individual had their own personal formula for success and personal requirements in terms of the skills and experiences that ultimately will be most useful. This was highlighted below, where a coach presented the need to challenge individuals according to their needs.

> "Challenge them in a way which suits them, because I think it becomes very individual you know. I think it's where team sports break down entirely. The team is pushed far too much and the individual isn't, that you need to get the best out of people."
>
> Individual Sport Coach

One coach below highlighted the need for a lot of individual attention, not only for development experiences but also recovery needs.

> "You really judge each athlete on their individual merits, you know their stage of development. You know the rest recovery needs of one will be probably a lot different from another one. So a lot of one to one attention is needed."
>
> Individual Sport Coach

Indeed, the extent to which individualised programmes are seen as important is highlighted below by the fact that no group programmes exist in one set-up

> "You've got to treat them all individually, that's how we had to get every single player here as an individual programme. There are no group programmes."
>
> Team Sport Coach

4.3.2.2 Ownership, Autonomy, and Self Motivation

Participants reported that developing athletes needed to take, and be able to take, an increasing amount of responsibility for their own development and

performance as they grow as athletes and people. This was thought to be necessary in order to reach the levels of commitment, learning and hard work required for eventual high-level performance. Skills such as self-awareness, self-motivation, autonomy of learning and self-responsibility were identified as crucial. The participants offered examples of ways in which this could be done including: allowing an appropriate level of ownership over goals and reviewing processes, delegating responsibility for life and athletic development, letting athletes make mistakes and helping them to learn to develop from them, not giving too much feedback too much of the time, promoting self awareness through questioning and appropriate feedback systems, and systematic education of the whys and hows of development and performance. All participants endorsed that this takes time and patience, but was the best way to learn.

> "I'd challenge the athlete to find their way of doing what I know they've got to do. So, that's part of the challenging culture. It's not good either, giving too much away, but more and more, the athlete will take responsibility of his or her own actions the better. That's the best way to learn."
>
> Individual Sport Coach

One coach below presented the need to develop ownership and self-awareness in order for an athlete to develop and enabling them to take responsibility for progression

> "Ownership and self-awareness, I just feel players who are directed all the time lack self-awareness and don't develop, you know, become robotic, whereas if he can get an understanding the way to design drills, the why you do them, to have a clear model of the skills that they're trying to work on...if you can get that sort understanding then you've got players who can self-coach and they can go out any time and do the drills."
>
> Team Sport Coach

Indeed, athlete responsibility was highlighted as important but it is easy for coaches to provide answers too easily for athletes, disrupting the necessity for them to take responsibility.

> "You've got to take responsibility yourself to develop the skills or whatever it is that you haven't quite got hold of. So I think the tendency to, definitely you can too much with people, you know, take them to the water too many times."
>
> Individual Sport Coach

With this diminishing responsibility comes disruption to effective learning experiences, highlighting again the importance of allowing athletes to learn from their own experiences and mistakes

> "As a coach you often get asked and you are very willing to give advice because you have been through that whole thing yourself as a person most likely. Also you have had other athletes that have gone through. Now again, like in all coaching, it is very dangerous to point out too many of the pitfalls that you might know yourself through your own experience because that to me pre-empts the learning curve."
>
> Individual Sport Coach

Part of the process which enabled athletes to take responsibility is helping them to think for themselves and understand what is happening and what options they have.

> "Explain to you why they made the decision and then you say to them well what were your other options? Why that possibly, that one could have been a better option? And they've gotta understand why because if they understand why they will then try and change their habit. So that is an important stage."
>
> Team Sport Coach

4.3.2.3 Ongoing Review and Goal Setting

The data highlighted that a systematic process of goal setting, developing and reviewing was crucial in order to promote change and to monitor and help an athlete through their, potentially unpredictable development. When these processes were effective, they provided integrated direction and purpose, feedback and opportunities for the development of intrinsic motivation and ownership. This ongoing review and

goal setting process was seen as both formal and informal, and from team to individual, ranging from end of season reviews through to fortnightly meetings to 'a word after training'. The quote below highlighted the continuous process.

> "We sit down, we have one to ones, we identify what key skills, key positional requirements, mental skills, together with the player, we determine from that rating what we've got to work on most, we help design activities. We then re-measure them see if they have improved a bit, it's just a continuous process of identifying what's needed and then delivering it."
>
> Team Sport Coach

Indeed, the quote below highlighted the need for this ongoing process due to the continually changing demands on the athletes.

> "You've got an ongoing process of planning, looking ahead, reviewing, monitoring, planning, reviewing, and it goes on all the time then I think we're continually adjusting to the demands being made on the player."
>
> Team Sport Coach

There may be situations where more reviewing is required, but essentially, it needs to be regular, but again individual circumstances may warrant different needs in terms of how often.

> "We do one on ones with players to look at the game as we feel it's needed or as they feel its needed, so I won't meet every week but every three weeks, I would say, I'll have met with every player either within a mini unit or individually to look at the game, look at what they need to improve, particularly if they are not being selected."
>
> Team Sport Coach

4.3.2.4 Importance of Informal Player Coach Interactions and Set Up

The role of regular and informal communication was a particularly important feature. The informal nature of many interactions was not seen as a replacement of formal meetings, but as a vital extra. The relaxed nature of these meetings more often than not resulted in sharing of important information and a building of trust, factors seen by participants as key for effective development. The following quote reinforced this:

"Ring them occasionally, sit down and have a beer, have a coffee, particularly with two or three of the more senior players in the side. Have a check, you know how you think things are going; this and that and the other. And then you run into others at various other times and places and that's an opportunity to have a quiet word with them more. And obviously you stop people pre and post training, pre post match times. I believe to be honest with you that rather than a lot of formal situations that informal is best ... That's what makes the whole team stick together, that communication....It's just a chat and it's a non-threatening environment. They'll tell you loads of things. Then you can get to know the players that bit better and know what makes them tick."

Team Sport Coach

4.3.2.5 Balance

The participants emphasised that creating balance in the athletes' lives was extremely important for sustaining successful progression. Particularly, developing an athlete's ability to relieve stress resulting from life and/or sport and develop effective mental and physical recovery plans would help prevent burnout. Furthermore, encouraging a balance of outside activities could also help athletes to see themselves from a more rounded perspective, and prepare them for the outside world. This was perceived to be part of the structure of established and successful systems.

"I think certainly at a younger age, if you looked at some of the academy models around, particularly in football, something like Ajax they work really hard on the values, on the balanced lifestyle, the values and develop character."

Team Sport Coach

One coach highlighted the need to balance life with personal development as well as sporting development as part of the challenge of development.

"I think they're (education/work/leaving home etc) part of the challenge as well. I mean X went to university, went home because he had the Commonwealth Games to do and various other things like that. So the competition structure didn't sort of endorse the university situation. But no, I think generally speaking those are the little challenges around and its part of growing up."

Individual Sport Coach

Indeed, athletes who are engaged seriously in an achievement setting may need help in recovering and balancing life in order not to burn out.

> "You might have to defocus them, to teach them how to relax, to teach them how to not over train, to get them into the mental stage where they are not overdoing it."
>
> Individual Sport Coach

4.3.2.6 De-emphasise Age Group Success

It was highlighted that de-emphasising age group success was a crucial concept for influential people to understand and implement within any TDE. For a variety of reasons it was seen as extremely difficult to identify those who will eventually reach the top, and without a change in emphasis on age group 'success', problems would continue to exist in selection, coaching and funding opportunities, aims and subsequent experiences. One coach below highlighted the potential dichotomy between success at a young age and success later.

> "You can be player of the year at 13 or 14 years of age, you can be a star. And then at 16, 17 years of age you can't get a game on your team, because the boys have just overtaken you."
>
> Individual Sport Coach

Indeed, there were numerous examples of successful athletes who did not gain a higher level recognition at an age group level.

> "There's two players here that missed out on representative teams when younger, late developers, they are now first teamers."
>
> Team Sport Coach

One coach highlighted the potential negative aspects of early selection/select squads on the motivation of a number of youngsters who may have potential to be successful.

> "The other thing I would say is advice to the governing body to keep large numbers of kids involved, I would get rid of County 'team sport' juniors. I would do some divisional 'team sport' at the age of under 16 but not until that stage, because all it does is it turns people off the sport, it's far too selective.

> Eleven get picked in the County, where there are actually 50 or 60 that could one day be great players."
>
> Team Sport Coach

Indeed, those youngsters who performed better at younger ages were often the ones who have had more training, but not necessarily those with more potential.

> "Now, invariably, the people who get picked at the bottom end of junior sport in the UK are those that have been coached earlier, started the game earlier, have got a head start, and they're not being rated with a future. They're being rated with a present."
>
> Team Sport Coach

As such, it appeared to be important to try to watch youngsters develop over time, and understand that large changes can happen in relatively short periods of time.

> "It's important to keep a look on players in general... I think it's very important at developmental level that don't write off the ones that aren't there yet when they're 16 because you will find in 12 months things will change dramatically."
>
> Individual Sport Coach

4.3.2.7 Role Models

Participants reported that peer group pressure could have significant positive or negative influence on a young athlete. However, systematic utilisation of role models was highly beneficial and the management of potentially negative situations was key. Positive examples included; mixing different close age groups at school or in the club environment, bringing in or exposing younger athletes to already successful elite athletes and or coaches, using video, targeting influential peers and utilising them, reading biographies or through mixed age or performance group meetings. The data suggested that this area was often not used to its fullest capacity and that is a large and exciting but currently missed opportunity. One example of this is to mix age groups.

"What we've done here at school which long time ago is double up the year groups so we have the under 13s and under 14s work together as under 14 A and B. Therefore you have two years of 14s - one when you're learning and one when you're the boss! And that obviously helps the younger players on hugely at each stage. And also then gives them some leadership experience as well. And then they're more, you know, cock of the school so to speak, you know. And that's the way it should be."

Team Sport Coach

The example below highlighted the motivating factor that being able to see others/ role models achieve can inspire great belief in others

"I would say my job is more as a motivator as well. To explain to kids there is a pathway to the job, there is a structure, I don't hide the fact that you've got to work hard, you've got some great role-models there, and we'd be delighted to have you guys pushing the people that we have in the institute here and it's not impossible. And give them some real-life examples of people who have already done that."

Team Sport Coach

However, role models can be a problem if the ethos of the environment is not conducive to development. This needs to be managed carefully.

"University is the death nail to most players. They go, even sports universities such as Loughborough, and drink themselves into the ground. Two years later they are no better. They are fat, they are unfit and they will never then make the step."

Team Sport Coach

The quote below highlighted the importance of integrating people with role models because this was more effective at influencing behaviour that coaches advice.

"That's the way to disseminate knowledge and it has some meaning because they can see then that real people have issues and problems, things that need to be resolved and they have solutions to them. And they want to hear it from them because they're not listening necessarily to myself or other coaches. But they will respect and listen to their peers and people they would want to compete with."

Individual Sport Coach

The quote below highlighted the impact a good role model can have in addition to any explicit coaching that happens.

> "A player has just retired from international 'sport' and he's 27-28, he's a gold medallist and the Germans consider him to be their best player ever technically. And this guy's performance - the English guy playing with them - has gone up another two steps. He is twice the player he was two or three years ago. That's not to do with my coaching, that's to do with him having a very good role model."
>
> Team Sport Coach

4.3.2.8 Complexity and Integration

It was consistently reported that there are a wide range of factors that need to be considered in any TDE, ranging from an organisational level to decisions made by the coaches themselves based on individual athletes with individual circumstances. As the data has shown, under the surface there are many factors that interact and affect each other significantly, and consequently the process and decisions taken are highly systematic, integrated and interdisciplinary. However, the participants stated that while the complexity of the process needs to be acknowledged, the end result and process needs to be kept simple to be effective and practical, as highlighted by the quotes below:

> "There are an awful lot of factors involved, which, if you like, we need to take the synoptic view to the players' development. Taking ideas in loads of different places and then simple advice from thereon in. I wouldn't say it's rocket science. I wouldn't say that you need to make it very, very difficult and intellectual."
>
> Individual Sport Coach

One coach highlighted the problem that some people have in impacting athletes' development effectively because they do not view the situation in a multidisciplinary or 'complex' way.

> "They don't integrate their thinking and therefore their actions are not integrated either. Now, that's not a criticism necessarily of them as people. I think it's more of a system, the system of production of them."
>
> Team Sport Coach

Due to the complex nature of what needs to happen, time needed to be allocated systematically in a very organised way for everything to be timetabled into the available time.

> "It is complex and you have to be very systematic in the way you set things up. For example, by Wednesday we need to have individual reviews and unit reviews, a full de-brief of the game we've just played, and a look ahead at the next team. They've got individual responsibility to look for body language and things in the opposition team, what they can attack, what they can exploit, what they can expect...to achieve it you can't just be willy-nilly, you have to look at times and resources."
>
> Team Sport Coach

Indeed, one coach highlighted that different aspects of development can impact on each other and as such needs to be thought of in an integrated way.

> "Not only is it important to be physically stronger, but I think psychologically it is a massive help. When you are physically stronger you are holding people off, you get to the ball alot quicker and your confidence growths so psychologically you improve as a player...and if you are confident you'll be relaxed, if you're relaxed you'll play better etc. and it all goes hand in hand, there's nothing works without the other part."
>
> Team Sport Coach

4.3.3 Importance of Ongoing TID and Opportunities

4.3.3.1 Athlete Development is Individualised and Unpredictable

It was clear from the data that development within and between individuals is individualised and unpredictable. Hence, performance result per se, are often a poor measure of potential and this needs to be accounted for in any TDE. Indeed, the quote below highlighted the need to still recognise those who 'disappear' from the scene may still have potential given time.

> "Sometimes it could be how their body grows in the wrong way. It could be outside interests, they could lose their belief in themselves. How many times have you seen in different sports young people coming along and they have the world scene for 18 months and they're gone, you never hear of them again. Sometimes they might be gone a number of years, then suddenly come back."
>
> Individual Sport Coach

This issue of performance results not being highly related to future potential is more and more particularly the younger you try to identify.

> "What you get is at the younger end, we're going to select him for the first year rugby team at stand off cause he's six feet six. And he's going to catch the ball and score tries for us. Or he's a big lad, sometimes a lot of time is invested in these so-called big lads in the first two or three years of their game playing career. Then all of a sudden other folk bypass them. And it's the wee dirt guy that's just been dogging in his training and all the rest of it and he's started to grow and become more physically mature. So I think people have to be careful."
>
> Team Sport Coach

Furthermore, the ability to outperform others can be lost over the course of time particularly through the adolescent years, where more change is occuring

> "It all depends on how they develop and I've seen some young people who were extremely talented as 12/13 year olds but by the time they have got to 18/19 they have lost their talent."
>
> Individual Sport Coach

The quote below highlighted that the progression and prediction of eventual performance levels is impossible to do. The importance was to provide good experiences and monitor and aid performers as they develop.

> "I have seen people who have developed and then stood still for 2 or 3 years and then suddenly things have kicked in and they've developed again. If we were capable of identifying that and bottling it, we would be winning everything. You can't, it is just how things go and develop and who knows what is going to happen."
>
> Individual Sport Coach

Indeed, the coach below commented on issues that exist at senior level partly being exacerbated by inadvertently narrowing the talent base too early by de-selecting future potential before it is possible to with any certainty.

> "Producing teams that haven't got enough power to actually play against the international sides, and yet they've got people that they've dropped out of the sport earlier because they thought they were uncoordinated or whatever, but they haven't given them the chance to grow. There's been some horrendous cases of that, where someone who's grown to 6ft 2 or whatever isn't going to look the same as a 5ft 2 person under the same conditions at 14 years of age."

4.3.3.2 Flexible, Open and Ongoing Development Opportunities

The unpredictability of the development process needed to be supported systematically with flexible, open and ongoing opportunities to as many youngsters as possible. One coach highlighted how this could be catered for through the club system.

> "They (clubs) need 12s, 14s, 16s, 18s yeah? And you need as many teams within each of those brackets as possible. So you play for the under 12 fourth eleven. And that is the system that has been running in Holland and Germany for years and should have been running here."
>
> Team Sport Coach

Indeed, another coach highlighted that providing opportunities to as many interested youngsters as possible allows for athletes to emerge over time and be picked up.

> "At the younger group you're giving the widest possible group experiences, and just let them get on with it. Observe them while they're having those experiences, and then gradually over a couple of years you'll start to pick out who the ones are that are going to step forward. Now, they're the ones that you need to pick up."
>
> Team Sport Coach

4.3.3.3 Skills that must be Promoted in Development Environments

The data showed that a wide variety of skills are needed for development. These included some more generic skills, such as fundamental movements, decision-making, life and mental skills. These were important as they provided a basis on which more sport specific development could take place. Importantly, skills needed to be developed in an integrated manner to be successful. For example, technical skills must be learnt in conjunction with decision making in order to encourage transfer to a game situation. This process needed to be systematic but at the same time allow for natural ability to shine through. The variety of factors was necessary

to promote effective performance and also effective progression, development and life management. The quote below highlighted the range of skills that are catered for.

> "Every skill you can imagine is applied."
>
> Team Sport Coach

Psychology was an important aspect of development, and the coach below highlighted that some coaches mistakenly believe is untrainable.

> "It's just one of the skills along with conditioning, along with technical skills, along with technical awareness. But it's given scant regard in most outfits whereas I think there's a belief where you've either got it or you haven't mentally instead of an understanding that mental skills can be trained like physical skills. We've introduced programs here such as centering or mindfulness, visualisation and goal-setting."
>
> Team Sport Coach

However, these expert coaches perceived psychology and player attitudes to be changeable/trainable.

> "You can get someone with a really awful attitude, but the way I look at that is, that's changeable. You can't change your genetics, but you could change somebody's attitude."
>
> Individual Sport Coach

Indeed, it is something that needed to be developed practically at early stages because like basic skills, under pressure players return to rote.

> "But when the pressure really comes on there's always returning to rote under pressure which is why it's important to start the psychological stuff fairly young. But I'm not sure that that psychological stuff needs to be 'lie on my couch' stuff, it's more practical psychology."
>
> Team Sport Coach

Fundamental movements and good co-ordination were identified as crucial aspects of skills development.

> "He's got to be able to run nicely. In other words, it's pleasing to the eye, smooth, balanced, able to change direction nicely, smoothly."
>
> Team Sport Coach

In fact, this was the main focus at early ages to provide fundamental movement skills to a wide range of children in preparation for sport and activity.

> "If it's 6-10 year olds the main aims would be to give fundamental movement skills."
>
> Individual Sport Coach

Quality development at the early stages can be extremely valuable for later development and as such the argument for quality coaches at foundation stages is made

> "Many people say that we need the best coach in the establishment is the head coach. But I disagree. For me, for me the quality of coaching I need this very low level. And I'd look at very good coaches for coaching the youngsters and bringing them through this process. Because if you get that process right, the end process is going to be very easy. If you don't get that right then the end process can be very difficult."
>
> Individual Sport Coach

The following quote highlighted that a focus on developing rounded athletes before starting to develop their 'sport specific' skills is important

> "Basically what I was trying to do is to make them being athletes, so it means not 'sport' but athletes first - running, swimming, introduction on bike, gym work – but only introduction at some point. And my first concern was co-ordination skill first."
>
> Individual Sport Coach

Finally, the individualistic nature of a young person's ability must be maintained, and a fine balance needs to be struck between discipline, technical quality and individuality.

> "I think with the environment, using the right coaches, and the very solid work through the respect, the discipline, the passion about what is being done, a good technique etc, so that a person that comes into your sport can see a way forward. They can see that if they are good at that then the next stage is this and the next stage is that. There is adequate technique coaching taking care of them as persons and as athletes through each of these stages but without making them all into soldiers where they are all marching up and down. That to me is a very fine balance, it's the same as developing talent and bringing technique in without losing the talent. It is having a structure/strategic plan in

a regimented way so that you are bringing things forward but still allowing for that individuality."

Individual Sport Coach

4.3.4 Results of the Deductive Analysis

The results from the deductive analysis showed that each of the 16 coaches provided at least some support for each of the features of the guidelines. Table 4.5 provided a more detailed breakdown of the extent to which support was provided through the deductive analysis, showing substantial support for the literature-based TDE guidelines.

Table 4.5

Summary of Deductive Data Analysis

Key Theme	No Support	Some Support	Support
Long-Term Aims and Methods		3	13
Widespread Coherent Messages and Support		1	15
Emphasise appropriate Development Not Early Success		2	14
Individualised and Ongoing Development		2	14
Integrated, Holistic and Systematic Development		1	15

While the limitations of qualitative research have been recognised in the 'support' that is provided by the data, the deductive analysis adds value to process of

validation and development of the guidelines. However, it was also useful as a brief summary to highlight that, while no entirely new concepts emerged from the analyses, the coach data supported the need to add context to two key aspects of the guidelines. First, the key method concerned with 'providing forums for open and honest communication patterns' would need to be expanded to emphasise the importance of incorporating both formal and informal coach-athlete interactions. Second, the key method 'provide regular individual goal setting and review processes' would also need to be further expanded to emphasise the importance of providing individualised programs (See Figure 4.2).

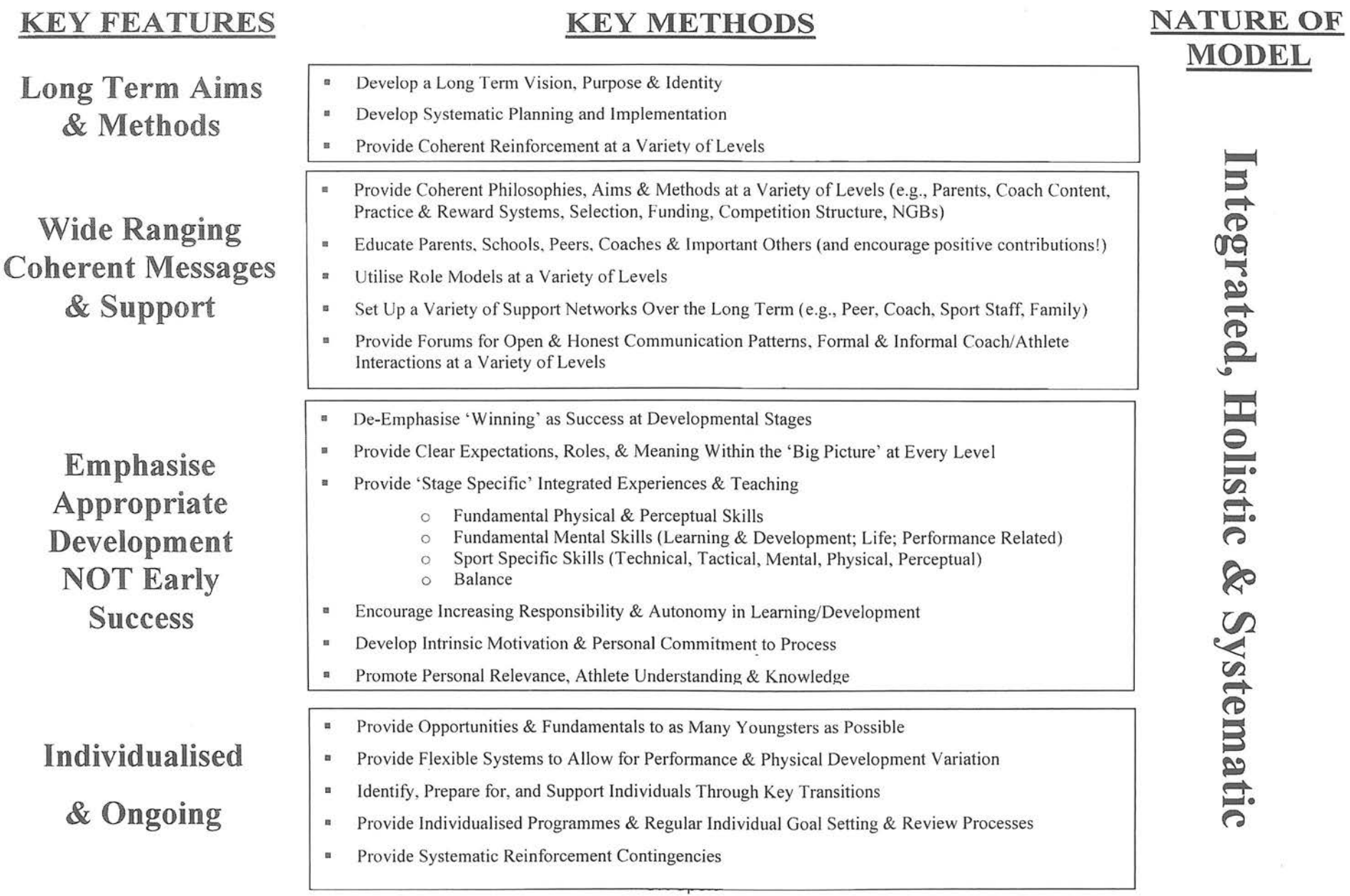

Figure 4.2. The features of effective TID procedures emerging from the literature and perceptions of top developmental coaches in the UK

4.4 Discussion

The results section was, by decision, detailed, and the inherent messages ring loud and clear. Before considering some of the many implications however, it is important to highlight the limitations inherent in the study, which must be considered against the comparatively clear results which emerge. For example, a small number of coaches were involved (N=16) and, perhaps to be expected as with any attempt to summarise and condense findings, not all coaches promoted each of the generic factors in exactly the same way or to the same extent. Additionally, agreement between participants was, quite understandably, 'clouded' by the sport-specific context in which they worked. Finally, it was recognised that the issue of generalisation is important, as in any qualitative investigation.

In support of the data however, the nature of both participants and analysis must be considered. First, the coach selection criteria so carefully applied obviously limited the sample size. Thus, the group is drawn from a comparatively small subset of coaches but, in the current context, could justifiably be seen as offering an 'expert opinion' on TD in the UK. As such, their opinions would seem to hold important advice for others; the selection criteria for inclusion certainly support this view.

Second, theme consistency within the data must be considered. Throughout the investigation, and reflecting good practice in qualitative work, careful steps were taken to avoid any leading of participants. However, clear and consistent guidelines emerged from this diverse sport sample, which demonstrate a clear coherence with those themes obtained from other research. Thus, qualitative limitations notwithstanding, this extended level of support is presented in order to enhance the user generalisability of the findings by providing the reader with the best possible

description of effective TDEs (Peshkin, 1993). Both message and methodological caveats are presented, allowing researchers, coaches and policy makers alike to use this work as a critical base on which to review, research and develop practice.

Finally, while the deductive analysis revealed good support for the guidelines, it is noted that this was still less than full support from all 16 participants. Where partial support emerged from coaches, this may well reflect a partial use or less than full understanding of the guidelines. Additionally, it may be that, even though substantial probing was utilised in the research methodology, these areas are used in practice but did not emerge explicitly through the interview. The idea that coaches' behaviour and decisions can be based on tacit knowledge has been highlighted (Abraham & Collins, 1998). Given the cases where partial support is apparent it is worth reflecting on the extent of the developing triangulation of evidence to guide conclusions about the validity of the guidelines.

With these qualifications in mind, four important factors emerge from the data, over and above the clarity of systemic considerations which is the primary message of the results. Firstly, the need for an integrated, pan-stage system was a clear and consistent suggestion from all participants. In the present study, the context of effective TDEs (defined as that which 'aids the development of those who have been identified as having 'potential') was associated mainly with academies and national age group standards. However, emerging from this developing picture of TDEs is that many; if not all of these factors apply across a wide variety of development experiences, such as school and club systems. To highlight this point, one participant in the study (ex-international head coach) was currently (and extremely successfully) coaching his sport using the same ideas at school, club and age group level. The data

supports the contention that the most effective mechanism for change and influence would be able to consider the 'athlete' and their experiences as a whole, whereby the overall philosophies and features espoused in the model would reverberate from 'the top' right through every youth experience, a situation only possible with the influence of those with power to change sport structures and education e.g., policy makers and governing bodies. Furthermore, the full context of the process appeared to require consideration of what happens before this 'stage'. For example, this study also supported the well-documented need for an early stage where fun, passion and fundamental skills (physical and mental) are introduced to all youngsters as a prerequisite for effective future development.

Notably, the lack of effective foundations was a common concern for the UK coaches, in both what and how skills were taught, a view that has been documented before (Moore et al., 1997). In line with this, the issue of when youngsters should be selected (or not) was key, and while selection is needed eventually; the timing, rationale and development experiences associated with it were promoted by participants as requiring special consideration.

Second, due to the recognised notion of late developers and the dynamic process of development and performance, supported by other research (Abbott et al., 2005), a depth of quality systems would sensibly be in place, outside of any select experience, to sufficiently aid those with potential who, for whatever reason, may be overlooked by often premature early selection.

Third, the data highlight a number of UK system-specific problems, including a lack of coherent aims between levels of development and clear long-term pathways; poor communication systems; lack of funding; potential detrimental

effects of University lifestyles, and a lack of a 'cultural mentality' for hard word, self responsibility and self-improvement. Given that this is UK specific it must be left to the non British reader to decide whether these issues apply to their own setting.

Finally, the nature of this report as an achievable but yet to be reached ideal must be stressed. For a number of reasons often outside their control, not all of the emerging factors were currently practiced coherently, or at all, by the participants: nonetheless, all were factors that the coaches believed were important for effective practice. For example, all believed parent education was important, but due to resource limitation it wasn't currently happening. However, the five key goals and systems that emerged were representative and provided a model for effective TD practice and critical reflection. Indeed, the level of support for the literature based model is impressive and provides evidence for its specificity to UK experiences. However, due to the nature of qualitative research and the need to examine any guidelines against 'real athlete experience', it is still necessary to check this 'model' against the experiences of developing athletes currently within the UK system. This was the aim of the next chapter.

CHAPTER 5 – WHAT'S BEEN GOOD FOR ME? AN ATHLETES' PERSPECTIVE ON TALENT DEVELOPMENT

5.1 Introduction

Chapters 3 and 4 provided a solid foundation, and good evidence for several generic key features of effective TDEs. Although these guidelines offered clear guidance for practice, a key 'missing link' was apparent. Athlete perceptions make up a crucial part of the picture (Kelly, 1955) and, given the apparently individualistic, indeed unique experiences of developing athletes, it was crucial for a range of athlete perspectives to be considered in the development of guidelines for effective practice, particularly in providing up to date and UK specific insight. Of course, the importance of utilising multiple source evidence for effectively identifying good practice was also well documented (e.g., Chivers & Darling, 1999), and the usefulness of further validation of emerging guidelines for effective TDEs was clear. Accordingly, this chapter examined the experiences of 43 developing performers in tennis, field hockey, rugby and dance to gain insight into practice that they had found useful in aiding their development thus far, and additionally to examine the extent of support for the guidelines to date (see Figure 4.2).

In pursuing the required description of athlete experience, however, the limitations inherent in the qualitative approach must again be acknowledged. In this, as in any other context, athletes may not be able to articulate their thoughts effectively, lack appropriate information, and have underdeveloped conceptions of what has helped, or may have never experienced certain aspects of good practice (Abraham, et al., 2006). Thus, it would seem unlikely that any one individual would or even could identify all aspects of effective practice; indeed certain aspects of the

model may be beyond the reach of their experience of the process so far, such as recognition of overarching aims. Accordingly, in order to offer the most far reaching guidance for effective practice, it was essential that opinion was sampled from a broad range of TDEs, and that the absence of supporting data from one sub-group be considered carefully against the extant picture from other work in this area.

Therefore, the aim of this study was to explore 'developee' perceptions of effective practice in a systematically selected, diverse variety of TDEs, in order to confirm and/or strengthen our understanding of effective TD. Seen as the third stage in this series of investigations designed to accomplish objective 2 in this thesis, and reflecting the caveats described in the previous paragraph, an inductive and deductive approach (Edwards et al., 2002) was utilised. This involved developing the 'theory' through an initial grounded theory analysis, followed subsequently by the deductive analysis which considered each individual's experiences against the TD structures revealed by the desk top study and coach perspectives in chapters 3 and 4 respectively.

5.2 Method

5.2.1 Participants

A deliberately diverse sample of young developing performers within the UK context were involved in this study, which included both team and individual sports, in traditionally male and female disciplines (22 females, 21 males; Age $M = 17.8$, $SD = 3.2$). The sample also represented athletes at a variety of stages and ages in their development, as opposed to sampling athletes who had all completed their TD programs. This aimed to gain more in situ, up to date and 'less retrospective' perceptions of athlete experiences and opinions. Although the domain-specific nature

of qualitative research was appreciated, the sample was also chosen with the aim of providing some form of generic dimension to the study (Guba, 1978).

Participants comprised 12 rugby players from three different English Premiership Rugby Academies (12 males; Age $M = 17.8$, $SD = 1.4$), 16 dancers from two prestigious Dance Schools in London (12 females, four males; Age $M = 18.9$, $SD = 3.9$), eight hockey players currently representing their country at age group level (eight females; Age $M = 19.1$, $SD = 1.1$), and seven tennis players training and performing within international age group squads (two females, five males; Age $M = 14.6$, $SD = 2.7$). All were considered 'talented developing performers' by the nature of their training, commitment, and externally prescribed status within their domain. In summary, all participants had already successfully passed through talent identification processes within their chosen activity, and were involved in development programmes.

5.2.2 Design

Qualitative methodology was selected in order to provide an insight into the nature of 'helpful development practice and experience' from the perspective of those developing performers currently in the various TDE systems. A semi-structured interview consisting of six open questions (see Figure 5.1) was designed to provide the basis for an exploration of the participants' experiences and opinions and to elicit truly open-ended responses (Patton, 1990). The interview questions were developed with the aim to encourage the athletes to talk about their development and identify useful and not so useful experiences and to give their opinions on what was required to develop further. The questions were not developed from any theoretical backdrop but rather against the purposes of the thesis. Accordingly, questions were

open ended and based on the experience and likely developmental time line for the participants, rather than on results from the two previous investigations.

1. Tell me about your involvement in *Your Sport* from when you first started until now?
2. Could you tell me about last year's club/select/coaching setup & *Sport* experiences?
3. What things were useful for your development in last year's club/select/coaching setup & *Sport* experiences?
4. What do you think are the main factors that players require to become/remain elite performers?
5. What other 'support' was useful for your development last year?
6. What sorts of things do you think will be useful in the coming season to help you develop further?

Figure 5.1. Interview questions

Two pilot interviews with international age group performers (soccer and volleyball) were carried out to evaluate and refine the interview guide and technique. Furthermore, the assurance of confidentiality to all participants, in addition to recommendations from Patton (1990), were to minimise interviewer bias and influence through the use of a neutral, impartial stance when probing participant responses, whilst maximising rapport, comfort, recall, and open responses (cf. Backstrom & Hursch-Ceasar, 1981).

5.2.3 Procedures

The status of the developing performers was identified through contact with the relevant organisations, and subsequently the interviewers contacted the participants personally. Once the nature of the investigation was explained and confidentiality and anonymity was assured all but one (who declined for personal reasons) agreed to

take part. The interview lasted approximately 45 minutes and was transcribed for future analysis. The interview guide provided a structure to which the questions were asked; however, in order to gain full understanding and clarify meaning, probing was used on an individual basis as required (Patton, 1990). To improve the reliability of the interviewing process between interviewers, similarly to the methods in chapter 4, the pilot interviews were used as examples from which discussion followed to align the interviewers as much as possible.

5.2.4 Data Analysis

Following transcription, an inductive grounded theory analysis was carried out, which utilised hierarchical content analysis (Cote et al., 1993) whereby three stages were followed (a) coding experience; (b) inductive inference and; (c) similarity processes. The structure emerging from the data is presented in Table 5.1., and is utilised in the results section supported by example quotes (Cohn, 1991). This initial analysis was subsequently followed by deductive analysis utilising the pre-determined set of themes and categories to organise the data (Patton, 1990). This involved coding the raw data from the interviews and then systematically organising the codes into the model where appropriate. To provide a sense of the extent of support, features that were supported were identified and any additional features highlighted, while percentage representations revealed the extent of the number of athletes who provided data to support individual themes. This represented a more simplistic deductive analysis than for the coach 'agreement', which some divided into no support, some support, and support. However, this is justified through the shorter length of interview and the likelihood of the less 'informed' nature of the athletes' experiences.

The use of inductive and deductive analysis in qualitative research was again pertinent (e.g., Edwards, et al., 2002) and it helped to add value to the body of knowledge by enabling research to be compared and contrasted more effectively with current knowledge and represented a method to try to establish this (Guba, 1978). Hence, utilising a presentation of results within both an inductive and deductive methodology, was carried out with the aim that the reader could more easily and critically interpret the extent to which the developing performers' experiences support the current guidelines associated with effective TDE (see Figure 3.2.) and as such enhance the quality of the user generalisability of the model (Peshkin, 1993).

5.2.5 Establishing Trustworthiness

Several steps were taken to establish trustworthiness. First, interviewing style was used to maximise the levels of open-ended responses (as outlined above) and two researchers carried out the interviewing in order to reduce any personal bias. Furthermore, the two interviewing researchers carried out reliability and consensus validation checks, with an additional third party to ensure an 'external' perspective (e.g., Bradley, 1993; Scanlan, et al., 1989). This involved two sets of analysis on five of the interviews, 1) raw data quotes being coded, and themes developed and 2) codes being matched to predetermined categories, and athlete percentage agreement. Finally, the results of the reliability and validity checks were discussed by the researchers, which acted to finalise details and confirm the level of agreement and consistency of the merging themes and categories and the subsequent support for the model (see Figure 5.2.).

5.3 Results

The main aim of this study was to explore the perceptions and experiences of 43 developing athletes to identify the nature of development and the types of experiences that were perceived to have helped or hindered their progress to date. The secondary aim was to assess the extent to which developing athletes provided evidence to support the guidelines for effective TD processes identified by previous chapters. Through the analysis of the raw data, 837 raw data codes emerged. These codes were then inductively analysed and subsequently deductively analysed in relation to the model.

Table 5.1

Inductive Analysis - The Themes and Higher Order Dimensions that Emerged

<table>
<tr><td>Individual development pathways</td><td rowspan="2">Individualised nature of development</td><td rowspan="8">Individual development focus</td><td rowspan="8">Supporting the talent development process</td></tr>
<tr><td>Multiple and individual challenges / transitions</td></tr>
<tr><td>Individual attention</td><td rowspan="6">Individualised development needs</td></tr>
<tr><td>Mental skills development & transition preparation</td></tr>
<tr><td>Variety of skill and attribute development</td></tr>
<tr><td>Quality training & competitions for all levels</td></tr>
<tr><td>Variety of support networks</td></tr>
</table>

Balance			
Long term focus & aims	Clarity & coherence of goals / requirements	Nature & reinforcement of ethos	Developing & reinforcing a 'professional' ethos
Clear expectations			
Coherence through the system			
Responsibility & ownership for learning & development	Promote psychological characteristics of potential		
Commitment & self motivation			
Understanding of self & process			
Role models	Role models & peer reinforcement of ethos		
Peer reinforcement of ethos			
Coaches, parents, support staff, peers, role models, significant others	Communication	Informal & formal development of coherent influence	Building the coherent 'team'
Coaches, parents, support staff, peers, role models, significant others	Relationships		
Coaches, parents, support staff, peers, role models, significant others	Education		

5.3.1 Supporting the Development Process – Individual Development Focus

5.3.1.1 Individualised Development Pathways

It was apparent from the data that there were a variety of pathways which led to the same position in the ranks of junior elite level. Some athletes started earlier than others, some specialised later than others, but interestingly, many ended up at

the same level due to athletes' ability to 'catch up' given the right experiences over time. Indeed, many changes also occurred, particularly through puberty which affected development either positively or negatively, depending on the individual.

> "I have been in full time training since I was 11, some of my friends in this school have only been in full time training for three years, they have continued with their normal life, their school life and gone to dance school every week, but they are at the same standard at this stage. I think it would be easier for someone to do it at this age because you are older you are a little wiser, you know what is expected of you, and your goals are more defined, to know what you want to get, so I think its easier around 14, 15 , 16, like obviously you have three years to catch up with those in full time training, and they have caught up, I think that's only because of age, obviously their physical attributes too, cause people can grow awkwardly, you can have talent at a young age but you can lose it."
>
> Individual Sport Athlete

High performance standard and/or selection attained through the age groups did not seem to be a pre-requisite of later development or indeed a hindrance. Sometimes, it was reported that early 'talent' was lost, youngsters with potential became de-motivated or burnt out, or selection criteria and/or the skills required at a young age for success were different to the requirements for a later stage. The quote below highlighted an example of the extent to which athletes progressed through age group squads.

> "If I look back at the Scotland Under 16 team that I played for, not half the girls are in 18s or 21s now and there's a lot of people that didn't get picked for squads and now they're in the Senior squad."
>
> Team Sport Athlete

The athlete below highlighted his opinion regarding the dichotomy between becoming a good age grouper and becoming a good senior player in the future.

> "People who work hard, are very focused can be good when they want to be. People who just play a lot of matches and, win a lot of matches at young level, don't necessarily become as good adults. Whether they've had to focus too much when they're young and they're absolutely fed up with it all by the time they get older, or whether, it's just the fact that the strokes and skills you need in the adult game perhaps haven't been fully developed as a child."

Individual Sport Athlete

Furthermore, this athlete highlighted potential difficulty in being 'picked up' at early stages and indeed, hints at the problems of one off selection and the fact that many able players tend to come through later on.

> "Some players won't be known at all, it just depends if the sort of range of selectors, it depends on how you play on that particular day or what they're looking for. I suppose when you're that age, it's more the flair of it, a bit better and it's not till later years that sort of core, like ability kind of able players kind of come through."
>
> Team Sport Athlete

5.3.1.2 Multiple and Individual Challenges/Transitions

While individuals appeared to develop through different pathways to get to their level, also a great variety of different transitions or challenges were faced by individuals on their journey. This only seemed to add to the complexity of the nature of development and highlighted the need for TDEs to consider both the individualised and generic support and development needs of athletes. For example, individualised and less predictable transitions might include a family tragedy, drastic body changes, being intimidated in a new set up, fast rise to the top. Whereas, more predictable issues may include the need for fundamental skill development, sacrifice and commitment, coping with exam pressure, university, and the step from junior to senior level. For example, the athlete below highlighted the real life issues associated with sport development that occur outside the 'performance' domain itself.

> "I think there are lots of things that make certain times more difficult like when you first go away form home at 16, that's very difficult, and then when you are growing up, where there is lots of other people and there is not much freedom and privacy. My mam died when I was fifteen which I found very difficult to cope with and it did affect my training cause I wasn't very happy. I am very lucky because I have people in this school, teachers and friends and everything."
>
> Team Sport Athlete

The pressures that exist for developing athletes was highlighted by the athlete below, and the fact that many youngsters do not cope well and lose the crucial motivation to succeed.

> "I think some of them have completely lost the will to be a dancer cause they are obviously not enjoying it, it's the pressure and everything and competition."
>
> Individual Sport Athlete

The sacrifices that needed to be made can often seem to occur at very young ages. As such, athletes needed a lot of motivation and support.

> "It was hard even at such a young age to decide whether to do it full time at such a young age, 10 or 11, its quite terrifying cause then I have sacrificed a lot of other things you know what I mean."
>
> Individual Sport Athlete

A key distracter appeared to be balancing training and education and not succumbing to a potentially disruptive lifestyle.

> "It's been quite tough sort of balancing the university and the training and the competing stuff. My first year really was pretty tough because I was missing my weight sessions, noticing a change in my body because of all the alcohol students consume."
>
> Team Sport Athlete

Importantly, it was not all about coping well with things that appeared to be 'negative' experiences, often someone can suddenly be very successful. Dealing constructively with this new 'positive' circumstance can also be challenging.

> "It was such a snowball affect, I was like at that audition, this audition, that school, this school, and it only hit home when I was there at the boys royal ballet school."
>
> Individual Sport Athlete

5.3.1.3 Individual Attention

Given that there were a lot of individual needs and changes throughout the development process, regular, systematic and individualised processes were required from beginning to end. In other words, needs analyses, goal setting, reviewing and

programme content all needed to cater at an individual level. The example below showed the regularity with which individual meetings take place and the open nature of the help required

> "Every two weeks we get individual one on one meeting with 'manager' to talk to him about concerns, things we're worried about, what our thoughts are and he'll try and help us out best he can. We go through our personal sort of profile. So he's saying like what we are weak on, identify these areas and now these are the things you need to implement"
>
> Team Sport Athlete

The quote below highlighted the ongoing review process of competition and the athlete responsibility for it.

> "After the game, we'll have immediate video sessions, Mondays individual video sessions which we try and work out what the mistake was, what built up to the mistake and how it can be fixed. We have group ones too."
>
> Team Sport Athlete

This athlete highlighted the need for individualising development programmes due to the fact that everyone has different needs.

> "Probably [need] more individualised programmes, there are clear programmes that are good programmes but they're generic. I'm on the same programme as every other player in the squad. but at the end of the day, it's about the players and at the moment a generic programme isn't helping everybody cos we have different strengths and weaknesses."
>
> Team Sport Athlete

The extent to which individualised help can bring a player on in their development is highlighted in the quote below

> "The individual help was just awesome and he would just point out stuff and I'd just become a better player in a matter of 2 months."
>
> Team Sport Athlete

5.3.1.4 Mental Skills Development and Transition Preparation

The need for individual focus, given the chaotic nature of development (Abbott et al., 2005) and the importance of transitions seemed to warrant specific attention. This was not only highlighted in the specific preparation for known or

likely transition periods, but also the development of mental characteristics which would allow athletes to deal with issues successfully, and overcome any problems or set-backs that may have occurred without prior warning. The athlete below highlighted his priority is to be ready for the big step up

> "Develop in my game all aspects of my game both physically and mentally. Try and be prepared if I ever do have to make a step up that I'll be ready for it."
>
> Team Sport Athlete

Indeed, athletes had to be resilient to knock backs in order to persevere and get to where they want to go.

> "I didn't even make district, it kinda does make you a lot more nervous the next time you go. But, it made me work harder for the next year. Then I got in the team. That year I got a Scotland trial, like my first year of playing district hockey. But I think with some people it would put them off."
>
> Team Sport Athlete

The quote below highlighted the need to build confidence in athletes to allow them to mentally close the gap between different levels of standard.

> "When I played 16s, it was a massive step but nowadays we train out there two or three times a week with the best guys in Yorkshire. So that gives you confidence to go I've done it before, I've had this training"
>
> Team Sport Athlete

The athlete below highlighted that the priority is clear for the first team coach, he wants players who are ready for the transition to the senior game, not a winning age group side.

> "If the first team coach said give me two players that are ready for to come away to France with us for the pre-season and our coach said our top players are injured, he wouldn't be very happy. He's not interested in the [academy] league; he's interested in whether the player's ready"
>
> Team Sport Athlete

An individual sport athlete highlighted that mental skills and characteristics are very important to help you deal with the harsh nature, and potential ups and downs of the sport.

> "Strong to get through and persistent, committed and dedicated and so you also have to toughen up yourself, cause the dance world is very critical."
>
> Individual Sport Athlete

5.3.1.5 Variety of Skill and Attribute Development

The quality of professionalism at the top level meant that a whole variety of skills were identified as necessary to make it to the top. Again these were highlighted as a most useful when developed on an individual basis.

> "You have individual sessions where you work on specific areas of your game that you need to improve on, you have like meetings for individual needs analysis, so you discuss like everything your whole life and everything like how your hockey fits into all that and how you prioritise and you get support science support sport psychology, you get physiotherapy, you get nutritional advice, sort of lifestyle management things and then you also have a strength and conditioning side. So you have a tailored programme of weights, which are supervised and a running programme as well."
>
> Team Sport Athlete

While many different skills were required to reach and succeed at the highest level in any domain including technical, tactical, mental and physical factors; it was highlighted that it is useful for development if a clear link and obvious transfer to performance is apparent.

> "Weights have been more specific for me on the pitch, to be strong upper body so I can make the hits so I feel more confident in making the hits."
>
> Team Sport Athlete

> "It's quite hard to incorporate into your technique classes, all the performance skills that is, because we want to be performers. Technique is not really enough, its not all it is, you need to have a bit more, So it was lovely to be involved with the second and third years, it was really good I had this experience."
>
> Individual Sport Athlete

"They're both benefiting me because, the coaching is a lot about technique and, tactics and thinking about what how to improve my own game. In the squads, it's thinking about how to use my game to beat other people."

Individual Sport Athlete

Part of this pre-requisite to excellence was sound physical fundamental skills, and participants highlighted these as necessary to progress effectively onto more complex skills and levels. The earlier these can be taught the better chances there will be for optimal development. Indeed, a variety of other sports also helped athletes develop transferable skills utilised in their eventual sport. The quote below highlighted the need to get the basics right.

"A huge emphasis on the basics of the game and getting all that right because other top countries are so precise with all their basics that they don't make as many mistakes. So there's a huge emphasis on getting the basics as good as we can get them before we start focusing on other things. Fitness as well."

Team Sport Athlete

The athlete below showed how other sports play a large role in balance and transferable skills to his main sport.

"If I try 100% intensity in every sport I play, then I get a lot fitter and become better at that sport which means I can work a lot harder in every sport I play, and I can feel the benefits of playing different sports and I really enjoy it as well. It's a change from just playing tennis all the time."

Individual Sport Athlete

This athlete highlighted the need to have developed physically in preparation for taking on more sport specific skills and performance development

"It is really useful to have that grounding and I think strength wise, you notice it especially when you do ballet and then you go and do contemporary."

Individual Sport Athlete

Indeed, this athlete below highlighted his opinion that practicing fundamental skills little and often would have a big impact on overall development and performance.

"More skill sessions I would have said. Perhaps even if it's just like an extra couple of hours a week, I think those need to be upped a little, just simple drills. A little bit each time, instead of just focusing on one set thing, I think it would be helpful if you visited everything at least a couple of times a week just to stay on top of what we do now."

Team Sport Athlete

It is important to highlight that as well as physical skills, mental skills were also emphasised as crucial for maximising development across several areas including learning and development, life skills and of course, performance. The quote below showed the usefulness of confidence in learning new skills

"If you believe in yourself, you'll try stuff. I think when you've got confidence the easier stuff does actually come easier, same as the harder skills. And willing just trying out new stuff, not being scared too."

Individual Sport Athlete

Indeed, life skills were reported as important and also trainable in the quote below.

"I think life skills for a dancer is a lot different to the normal teenager, but I think they can be taught."

Individual Sport Athlete

This athlete highlighted his club's commitment to developing the psychological aspects of players because of its importance in the sport

"That's why they brought Paddy in cos he's got a degree in psychology and he knows his stuff from that point of view, so if we do have any problems, he's the man for it and that's hugely important cos there's loads of people out there with the skills, it's just whether they've got the mindset or not"

Team Sport Athlete

The quotes below showed that psychological aspects of performance are also looked at and developed within the development process.

"We look at aspects of how to deal with pressure situations, how to control your nerves before a match. How to deal with things during the game if you go a goal down or a goal up, mentally how to react to each situation and it's how you prepare to face the different challenges or tournament situations and things like that"

Individual Sport Athlete

"He does a lot of psychology with me cos I'm quite bad and I let things affect me really a lot. I let things affect me that I can't change in me game. That's an area of my game that needs to be developed"

Team Sport Athlete

"Determination, I think self-esteem is a big thing, could be coached in terms of, in terms of determination to be successful. I think a big thing in dance is to feel that you are good enough."

Individual Sport Athlete

"We occasionally do mental work but that's involved in tennis anyway. It's just like concentrating on being positive and not losing your temper and thinking about what your opponent does and just think about tactics."

Individual Sport Athlete

"There is an awful lot that can be done psychologically, how confident we are, how relaxed we feel when we dance, how much motivation we have and that's going to be what gets us through."

Individual Sport Athlete

5.3.1.6 *Quality Training and Competitions for All Levels*

It was clear that fundamentals and sport specific experiences were required to progress effectively and at the same time different people develop at different rates, so inclusive opportunities must exist in which lots of youngsters can attain an appropriate level of opportunity, resource and organisation. Without this many, even those who have significant future potential, can not develop at their current level effectively. The quote below reported the problems of large mismatched standards in a club league.

"I think the biggest problem with the structure in *National sport*. It's a joke. We're going out and hammering teams 15-0 at the weekend and it's like what good is that doing us and what good is it doing them."

Team Sport Athlete

The athlete below showed the issues surrounding providing opportunities for those players who are on the brink of selection, who presumably could make it one day, perhaps with the right help.

> "So it's quite tough for people to catch up [if you're not given the opportunities], then if you're just on the brink, if you've had a kind of bad year and you get put out of the institute then it's kind of like, what do I do now sort of thing."
>
> Team Sport Athlete

The need to provide opportunities to challenge youngsters at the level which will help them develop was crucial.

> "I suppose it's an advantage for girls who are at private schools but for state schools it was kind of a way to get all the ones they thought had potential to get us together and play with sort of similar abilities to try and bring each other on, with obviously higher quality better quality coaching as well."
>
> Team Sport Athlete

Indeed, the need to ensure opportunities are inclusive, but challenging for individuals is perhaps a difficult but necessary part of development, where mixing age groups could provide one part of a solution.

> "It definitely was inclusive but they split you into groups to set your standard and although I was perhaps like same age as some of the girls, not necessarily be in the same group, you know, I was sometimes in with slightly older people, which definitely helps you if you're playing with older people."
>
> Team Sport Athlete

The need to manage players to ensure they get enough competition/performance practice of a good quality was important and often problematic

> "In terms of full *International*, anyone who's potential for the *International* isn't gonna have to worry about getting pitch time but that would be a major factor for me, like getting the pitch time to keep match sharp."
>
> Team Sport Athlete

Indeed, development was also about helping to provide opportunities to those who may have potential but lack financial support

> "It's quite expensive cos like the coaching and like all the equipment and if you change racquets it's quite expensive cos you need like 2 racquets. The Council have been quite good cos they've like helped me with like money and that cos they gave me quite a few grants."
>
> Individual Sport Athlete

Furthermore, the data suggested that while systems need to be set up to allow a wide range of opportunities, they also needed to be accessible.

> "I've been invited to quite a few recently [training sessions] but I had to turn them because they were asking me to go down south on a Friday evening for 2 hours."
>
> Individual Sport Athlete

> "I play mostly in England because I'm currently the top three or four in Scotland. So I have to go down to England because of my rating. There's not anyone here I can play to get a win to get ratings."
>
> Individual Sport Athlete

One key to optimising the developmental process involved providing opportunities at the right level for many youngsters, in a system with clear expectations and flexible enough to allow identification and movement between opportunities when appropriate.

> "They were good at picking out talent and, if we weren't good enough, then they wouldn't have put us in with the boys cos it would have been too dangerous. So it was all about kinda identifying if you were able to play with them, was it feasible like going away on trips and, you know, stuff like that."
>
> Team Sport Athlete

> "They're always looking to develop for Under 18s, they're looking, can they perhaps move some Under 16s up this year, you know, to improve them further are they able to cope with moving up an age group or any sort of thing."
>
> Team Sport Athlete

5.3.1.7 Variety of Support Networks

An area highlighted as crucial for development and successful progress through transition periods was a good support network. This included a variety of different people and organisations, including peers, friends, family, staff, coaches and institutes. The quote below showed the importance of the supportive atmosphere of the development set up.

> "Our group are all quite supportive of each other I think in general and I never felt like the social aspect of the school has ever been detrimental to

training, from the students point of view it is quite a supportive environment, but then different years can be very different, and I know in the school I was at before it just became really intimidated and quite nervous of doing things."

Individual Sport Athlete

This athlete highlighted the need for parents and families to be able to deal with the demands of athletic development and provide the necessary support.

"There's a lot of travel. Some families deal with it better than others."

Individual Sport Athlete

The athlete below reported the importance of taking responsibility for having support structures, particularly if there is no structure provided for you.

"From being trainee to professional is really knowing where your support systems are, where to really get it right, trying to balance out your life, not having the school support structure, so you have to set up your own structures."

Individual Sport Athlete

The quote below highlighted the usefulness of having people who know where to get help from and can provide experienced advice themselves.

"The people are there to help to go and talk to and they're like, oh I know a person who can help, in that way they are really informative cause a lot of them have been there before, its really good to have people in house who has been there done it."

Individual Sport Athlete

5.3.1.8 Balance

Along with a focus on what needs to be developed, a focus of balance was reported as important in terms of physical, emotional and mental stimulation and recovery, where optimal development is then possible. Indeed, it was also related to balancing sport with continued development on a personal level (e.g., education or training). The quotes below showed the need to incorporate recovery.

"You've gotta definitely have balance. You can't just be rugby all the time. Even with the first team, we gotta saying, ER which is emotional recovery."

Team Sport Athlete

"I think this would be a good thing to have a bit more emphasis on well-being on the dancer's body and mind. We don't really take care of ourselves too much and no relax at all. It would be nice, I think that a lot of us know that we need to massage quite a lot, often and stretch often. That helps you recover."

Individual Sport Athlete

"I think it is quite good if you can just go out and watch a movie for a couple of hours. Work hard and play hard. As long as you've got that equal balance."

Individual Sport Athlete

The quotes below highlighted the need to continue some sort of personal development, whilst committing to a sport because sport is so competitive and to provide balance to the professional sport lifestyle.

"Not everyone who comes to this academy is going to become a professional because its just so competitive, but so far in our training it has not been addressed."

Team Sport Athlete

"They promote further education cos there is a lot of people just coming out of school, so you don't want to come too heavy down on like rugby, rugby, rugby."

Team Sport Athlete

"I still wanted to carry on my training and still complete A-Levels and I wanted to try a few other art forms so that's why I came here."

Individual Sport Athlete

5.3.2 Developing & Reinforcing a 'Professional' Ethos

5.3.2.1 Long Term Focus and Aims

Almost all of the developing athletes in this study had aspirations to become successful at the senior level, and appreciated experiences that explicitly helped them develop for the long term. However, it was also recognised that developing potential as far as possible was a necessary process and a worthy aim in itself.

"Getting into the first team squad. That's been my main goal. If you're a good 21s player but you don't play first team, you've achieved a certain amount but you haven't achieved what I call is your own sort of goal."

Team Sport Athlete

> "You wanna play up there *(Top flight senior rugby)*, if you can't make it up there, [they say] we'll make you as good a rugby player as we can."
>
> Team Sport Athlete

The long term nature of these ultimate aims fed back into more short and medium goals which enabled a step by step progression depending on the stage of development of the athletes. Indeed, it needs to be recognised that different stages require certain pre-requisites before moving on and progressing, for example, a certain level of intrinsic motivation is required before dedication, and a baseline level of physical strength is required before successful transition to senior level rugby.

> "The school prepares you very well for going onto a professional company because you have the technical training in your first and second year, you have your performance year, you have worked for different choreographers, gone on tour around the country."
>
> Individual Sport Athlete

> "Obviously the final was to play in the first team. But this year, I've just set my targets to develop physically, a lot of work in the gym and basically skills, handling skills and contact skills, that's what this year is all about really."
>
> Team Sport Athlete

Furthermore, the athletes highlighted certain potential pitfalls and 'false pursuits' in terms of necessary pre-requisites to long term development. For example, an overriding emphasis on winning at younger ages could provide either false expectations and / or false direction.

> "I always say it doesn't really matter if I'm not winning just now, because how many people at Wimbledon, for example, have been junior winners?"
>
> Individual Sport Athlete

> "Obviously when they're really young that they're told they're good and so they think they're like God's gift kinda thing by Under 18s they kinda realise that they're a bit out of their depth and they're absolutely devastated that they've not been picked. So I think, you know, it's getting a balance of appreciating that you've got this talent but at the same time kinda being careful with it"
>
> Team Sport Athlete

5.3.2.2 Clear Expectations

In light of the tough nature of TD and the apparent need for long term focus throughout, the data suggested that clear expectations appear to be crucial for developing athletes. For example, they act as a clear direction for development, highlighted the ethos and lifestyle required to make it and provide a realistic and necessary level of confidence, assessment and goal focus. While this was done explicitly, it was cited that mixing with and experiencing the lifestyle and training/performance standards at the top level provided an invaluable 'eye opener' to what was required. The quote below highlighted the importance of being given insight into the professional world.

> "She gave us an introduction to what we may be asked to do as working professionals, I think that she is a great teacher and she has many, many great aspects, as I said earlier, I think a dance teacher should develop your awareness of what's going on, and also work your performance aswell, and she did that."
>
> Individual Sport Athlete

The athlete below reported the usefulness of being able to directly compare yourself against the standard you are aspiring to.

> "We can sit down and just go through our videos and stuff and the other day we compared it to our first team guys. So how far am I behind guys and then I can see where I've gotta make up these margins and stuff"
>
> Team Sport Athlete

The athlete below showed the need to explicitly learn to do what you will be doing when you step up to the 'senior'/professional level.

> "It was like a rounded teacher and she kind of had all of the packages in one, he was doing material and choreography and designed that class that was what you would be doing in a lot of the professional companies now"
>
> Individual Sport Athlete

Having the opportunity to interact with professional athletes allows young athletes to gain a very clear idea of what is required and expected at that level.

"Just seeing how they sort of conduct themselves like sort of on and off the pitch and what it takes to be like a professional rugby player. So, you know, there's no excuse for not realising what it takes cos we all know what it takes."

Team Sport Athlete

5.3.2.3 Coherence through the System

It is well known that consistent results are most likely to develop through coherent reinforcement. The data here showed sport was no different, and the system within sport has many powerful influences ranging from selection, opportunities, competition structures, coaches and funding to name but a few. As such these influences needed to present coherent messages in order to provide consistent focus and experience for developing athletes. For example, age group select teams were often selected on one off assessment and trained on the coach's agenda, in other words, to prove who is best team (or coach!) rather than for the development of the individuals involved. Both of these issues had obvious consequences for development.

"I have had a few coaches that have been out because they want to prove that their team's the best and as a personal point of view, it hasn't been for my development."

Team Sport Athlete

"I played terrible, like so bad and I didn't get in that year (U16 district). To think that now I play *International* Under 21s, you know."

Team Sport Athlete

"Players are only seen there on the day. I think selection should be done over a longer period of time."

Team Sport Athlete

It seemed necessary that a planned and explicit focus is required for coaches and athletes in order to reinforce coherently the long term focus and the training /competition behaviour required for progression. The quotes below highlighted the

need to keep the long term goal at the forefront and running through planning and development.

> "I think if I do mess up, they think, it's ok because he's progressing, although I'm there to play, they recognise that I'm also there for my development."
>
> Team Sport Athlete

> "(I'm interested in) things that are going to carry me through a career or things that will enable me to have a career in dance rather than thinking about what I am going to get in an assessment grade."
>
> Individual Sport Athlete

> "One coach used to say one thing and one coach another. They get together on coaching days and seem to have formed a basic system which they all agree on."
>
> Team Sport Athlete

> "All the training you get from Under 16s to 21s is similar in a way but the fact that at the 16s level it's more simplified and it's not as intense and I think that at 16s level you've got a lot more of a fun element through it. 18s is like quite a bit more serious than that and 21s is as serious as you can get."
>
> Team Sport Athlete

5.3.2.4 Promoting the Psychological Characteristics of Athlete Potential

The ethos or culture that needed to be developed must involve clarity and reinforcement of long term goals and expectations, but it also needed to develop certain attitudes and behaviours in the athletes. In fact, the very factors that are often cited as characterising those with most potential need to be encouraged. These have been highlighted consistently in the data as responsibility and autonomy/ownership for learning and development, commitment, intrinsic motivation and understanding. The realisation of the need for responsibility is clear in the quotes below.

> "I think it has taken me two years to actually realise that I am actually here for myself rather than being here to impress the institution, it doesn't matter whether I impress them when I leave, that's not how you get a job, I can be a good student but does that constitute being a good professional."
>
> Individual Sport Athlete

"If you make a mistake, [they say] do you want us to tell you, you know, why you made that mistake or do you not want to figure it out yourself because in a match you won't have a coach there to tell you. I like to try and work things out for myself. You learn a lot more."

Individual Sport Athlete

"At the end of the day, if I don't come, its my life it affects its not theirs. It takes the emphasis off being able to listen to my body and my needs and what I think is right for me. And everyone here is really dedicated and it doesn't mean we are any less dedicated if we take a day off to get better."

Individual Sport Athlete

The athletes below reported the importance of dedication and commitment to the process, without it there would appear to be no chance and with lots of it there would appear to be every chance of making it.

"If you're really into it, then you should just keep going cos if you're into it, like there's a good chance that you'll make it if you're really that dedicated."

Individual Sport Athlete

"Commitment's one of the most important things, Self motivation as well. You've got to be self motivated to get where you wanna get and if you wanna be a top player, then you've got to be motivated yourself."

Team Sport Athlete

The quotes below highlighted the importance of understanding, in order for the athlete to manage themselves and continue self development as they progress.

"If there's things I'm doing wrong, they'll say, just do it this way and it's good that way. With an understanding of why it might be better to do it that way, instead of just, you know, instead of just giving me a bo****king."

Team Sport Athlete

"As you get more professional and better at dancing, you fine tune what you are good at, you understand yourself as you get better. Before you are just doing it because you are told to, later on you start to understand what you are doing."

Individual Sport Athlete

5.3.2.5 Role Models

Peers and expert performers as 'role models' were identified as an extremely valuable 'development tool' by providing implicit and explicit education, motivation

and clarity of focus. Examples of utilising role models included mixing with better standard of players, integrating different year groups, playing or being coached by older more experienced athletes, making the most of talented peers and already successful people.

> "Everyone that was in that group were absolutely fantastic, we had guys and girls from America, Canada, Italy, all of them very, very high standards, all of them were talented in a different way, It was really useful for me because I could draw on their talents and learn a little bit form every single person."
>
> Individual Sport Athlete

> "You can obviously see the best people, you don't necessarily see it in your own year, in other years you see those that are really good and you watch them dance all the time and then you have role models from the Royal Ballet etc."
>
> Individual Sport Athlete

> "I went away to France I was with them (the first team professional squad) for 11 days and it was a big insight. It was so beneficial to me to sort of go and live with these guys and eat what they eat, train when they train, go to sleep when they go to sleep. It was a big, big, learning curve. I think more of that would be beneficial to the academy."
>
> Team Sport Athlete

5.3.3 Education, Communication and Good Relations (Informal and Formal): Coaches, Parents, Support Staff, Peers, Role Models, Significant Others

The wide ranging influence on a developing athlete meant that good communication and relationships needed to be developed in order to understand and manage individual athletes and their situations. This need for coherent practice drives the requirement to educate and encourage people to contribute positively to young peoples' development. It was imperative that these exist between a variety of people and organisations, not least, clubs, universities, schools, parents, staff and institutes. To a greater or lesser extent, the participants identified this need and found it extremely useful when a consistent and coherent developmental focus was provided

by important influences around them. The quotes below highlighted the need to develop coherent messages for athletes.

> "I know that all the teachers have meetings so I think they probably have overall aims, and I think the teachers have their own aims within that. You have different teachers each term and they seem to complement each other."
>
> Individual Sport Athlete

> "The RFU academy coach is also the chief guy where he goes to academy training and tells them exactly what he wants to be coached. And there's one of the first team players coaches our academy too. So it's all the same messages."
>
> Team Sport Athlete

> "The teachers try to learn what the support staff are teaching us, so that they are on the same wavelength, they know what is going into my head."
>
> Individual Sport Athlete

Ongoing communication between important parties was also crucial to maintain the coherent messages to the athletes.

> "Communication between my parents and *Development managers/coaches* if they want to they can just pop in and talk to them."
>
> Team Sport Athlete

> "At the start of uni they used to have a big seminar. So the parents and then they used to go through slides and a lot of what we're about and what we promote."
>
> Team Sport Athlete

> "A*cademy coaches* have got like an understanding with my school teacher and like these guys can all work out what's best for me."
>
> Team Sport Athlete

> "I couldn't get any work done, *development manager* got in touch with our bloke at the uni and said, I'll be away with the first team, won't be able to get anything done. He said he'll sort it out"
>
> Team Sport Athlete

Having support structures in place is one thing, having the right atmosphere in which to best use those support structures is another. The participants highlighted that an informal, friendly atmosphere with good relationships appears to be a necessary partner to formal systems, providing benefits for development due to the

perceived and real accessibility of support and open communication channels for the developing athletes. The quotes below highlighted the usefulness of an informal, welcoming atmosphere and 'open door policy'.

> "If there is something bothering me that I know is more in my head, than in my body, but is affecting my body I usually just go and talk to somebody about it."
>
> Individual Sport Athlete

> "Communication with the likes of the academy coaches and anyone else, you know, and the players and the first team coaches, physios, I find that's quite open and quite easy and all quite informal, quite relaxed"
>
> Team Sport Athlete

> "Whenever you have any problem, you should just go to teacher x, she is lovely, she speaks very well about everything, she just makes you feel so much better and I could go to the other teachers, they are all open, all really willing to listen if anything is wrong its really nice to know you have someone to turn to if you have something wrong and I think that all these staff really care quite a lot about the students"
>
> Individual Sport Athlete

Indeed, the athletes themselves need to have the confidence to go and ask for advice if they needed it.

> "It's quite harsh on them because the boys sometimes found it hard to realise why they're not being selected. So I think it is a problem but it's a problem that is easy addressed if you've got the confidence to go and ask people."
>
> Team Sport Athlete

5.3.4 Results of the Deductive Analysis

The results of the deductive analysis revealed good support for the features in the model. All the guidelines received support to some degree by the data, and in order to shed light on the extent of the support for each theme, percentages of athlete support are presented. An overall percentage for each main theme is presented below, representing an average percentage from the 'key methods' within each 'key feature'.

Table 5.2

Summary of Deductive Data Analysis

Key theme	Percentage of Athletes Providing Support
Long-term aims and methods	80%
Widespread coherent messages and support	82.2%
Emphasise appropriate development not early "success"	86.7%
Individualised and ongoing development	76.4%
Integrated, holistic and systematic development	65.2%

While no brand new features appeared from the athlete data, the nature of some athlete experiences did warrant additional context being highlighted. First, the nature of sport specific skill development presented a need to ensure that practice transferred explicitly into the performance domain. Indeed, athletes highlighted that performance specific training was lacking, and technique training did not always transfer effectively. Of course, foundations are important, but in light of this, careful attention may need to be given to the way in which skills that transfer to the performance domain are developed or expectations about these requirements are communicated. Second, the need to provide opportunities at the appropriate level was widely supported, but it was emphasised that, not only do these opportunities have to exist, but that the accessibility of these opportunities also needs careful consideration.

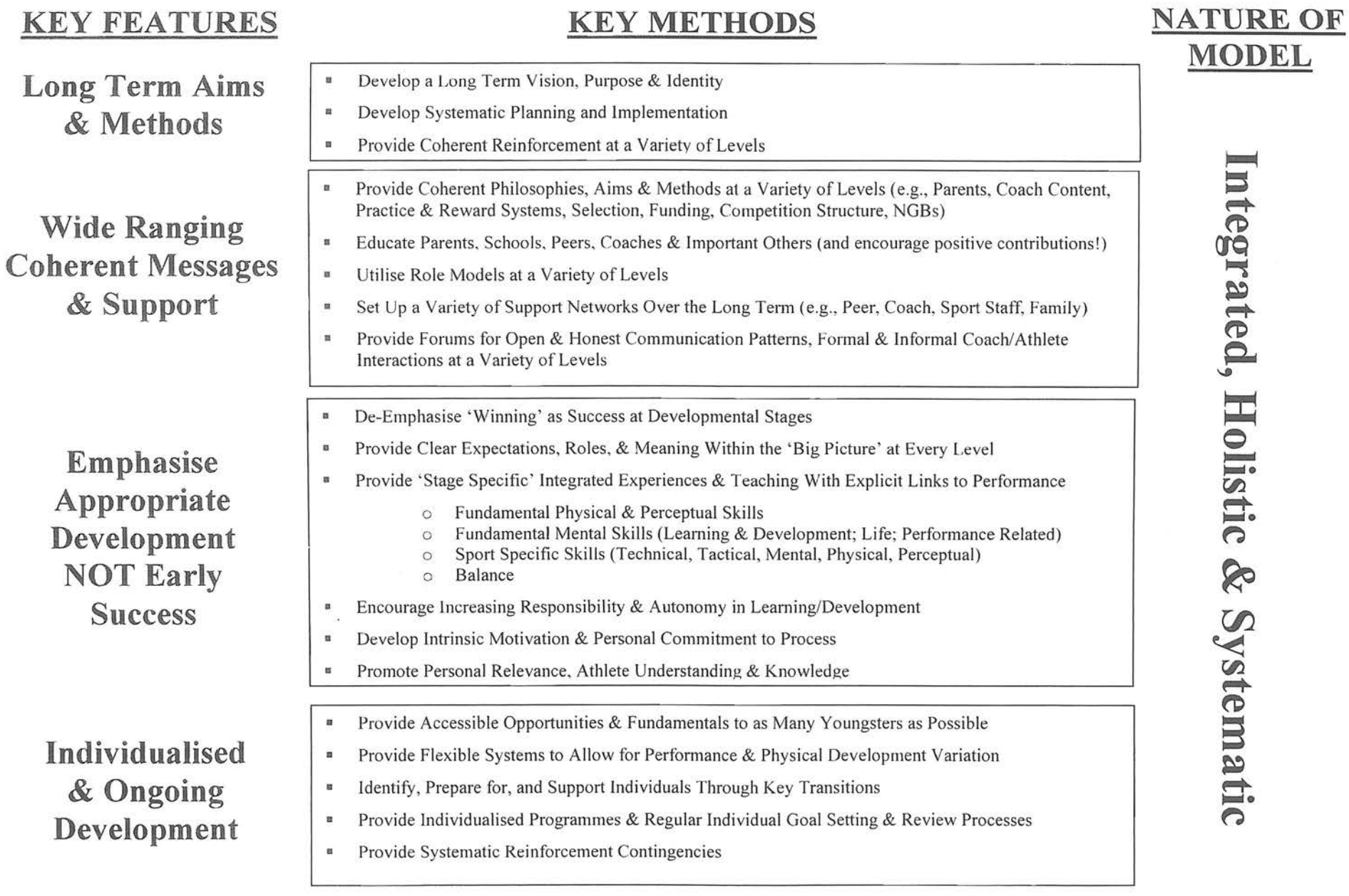

Figure 5.2. The guidelines associated with effective TDEs based from evidence in Chapters 2, 3 and 4

5.4 Discussion

The aims of this chapter were to examine the nature of athletes' experiences and perceptions of useful practice and subsequently investigate the extent to which these perceptions were coherent with guidelines previously identified through theory and empirical work (Figure 5.1.). Before the results were discussed it was important to outline some necessary limitations to this work, to allow the reader to critically evaluate the results more effectively.

First, it was important to recognise that the athletes in this study represented a range of ages and stages of development (albeit all deemed within Bloom's development stage) and, as such, many would have potentially had very different development experiences, simply because they were engaged in different sports with different coaches and systems for differing amounts of time. However, due to their current involvement it was hoped that a more up-to-date and relevant data set would be gleaned, more applicable to the current context within UK sport.

Additionally, given that athletes may not be able to articulate their opinions effectively, have under developed conceptions of what has helped or potentially may not have yet appreciated what will/has helped, and/or may not have received many or all aspects of good practice, it is unlikely that any one athlete would identify and show support for all aspects of the guidelines. Indeed, this is one rationale for selecting a relatively large sample of athletes and as such, given the subsequent need to compare these results with previous work in this area, deductive analysis was carried out (e.g., Abbott & Collins 2004; Abbott et al., 2005; Bloom, 1985; Cote, 1999; Ericsson et al., 1993).

In an attempt to generalise results (Guba, 1978), more specifically with a view to enabling the reader to extract personal relevance to their domain and experience (i.e., user generalisability: Peshkin, 1993), it was important to provide the reader with a variety of example quotes in order to help contextualise the nature of the support for the guidelines, and provide a level of transparency and clarity to what was observed. Additionally, the deductive analysis represented some extra information and systematic analysis on the extent of agreement with previously identified TD guidelines.

The results themselves highlighted three main areas of useful practice. These included the recognition of the individual nature and variation within development and subsequent support for that. Whereby, development needs included systems that ensured individualised needs analysis, interventions and evaluation of individual progress; identification of transitions and challenges, with appropriate mental and physical skills development and support to enable successful progression; an associated wide variety of skills development which related explicitly to performance; quality training and competition experiences for all athletes at their required level; a variety of support networks; and a focus on balance through the athletes life.

Second, the development and reinforcement of a 'professional' ethos where a long term focus was clear, as were expectations for training, competition and lifestyle requirements, which was coherently reinforced and planned through the sporting system. Key characteristics needed to be fostered, identified as athlete responsibility and autonomy/ownership for learning and development, commitment, intrinsic motivation and understanding. This ethos appeared to be best reinforced

from a number of influences including exposure and integration to top level players and environments.

Finally, the development of a coherent team through good communication, relationships and education between a number of significant influences and the athletes was highlighted as crucial. Indeed, the informal nature of such aspects of practice was highlighted as particularly useful for effective development.

The deductive analysis revealed good support for the model across the range of participants. In short, all but one feature received supporting evidence from over 75% of athletes (range: 76.4 – 86.7%). The area that received less support was 'integrated, holistic, and systematic development'. However, support of 65.2 % highlighted perhaps that it may not represent lesser status, but merely the extent of athletes' explicit awareness of a theme which perhaps represents a more conceptual aspect of the model. In conclusion, this data presented a three feature picture of useful practice from the athletes' perspective and supported the model of TD developed in earlier chapters.

CHAPTER 6 – QUALITATIVE SUPPORT FOR TDE GUIDELINES AND THE NEXT STEPS

6.1 The Story So Far

The critical examination of TD policy and procedures within the UK in chapter 2 revealed that there was a clear lack of evidence to support Government recommendations, specifically the use of LTAD (e.g., Stafford, 2005). Furthermore, the advice that was available within this model appeared too vague to offer concrete practical suggestions applicable to those working 'on the ground'. In addition to these problems, there seemed numerous examples across the world where practice contradicted clear messages emanating from current TD research findings. In short, there appeared to be a lack of evidence based practice within TD, with few links between theory and practice, leaving expertise to remain adhoc and dependant on those individuals with the necessary practical experience. This replicates the issues raised by Christina and Bjork (1991) within the motor learning literature, whereby the extent to which research was informing practice was almost non existent. This highlighted the need for work to focus on not only identifying effective practice in an excellence environment (Bloom's 1985 development stage) but also ensuring that it could be disseminated and useful at an applied level (Christina & Bjork, 1991; Douge & Hastie, 1993)

The initial three studies of this thesis have offered qualitative support for guidelines for effective TDEs. This has taken place through a triangulation of evidence including a desk top study, interviews involving 16 expert development coaches and interviews involving 43 developmental athletes. Importantly, these three pieces of research have not only identified guidelines consistently, but have also

provided a wealth of declarative knowledge underpinning them. This has taken the form of explanation within the text and the use of references, coach and athlete quotes. The importance of this declarative knowledge lies in the fact that it is necessary to provide more than just procedural rules for what to do in practice (Abraham & Collins, 1998). Coaches and policy makers need to have the understanding of when and where these guidelines are applicable, and use their knowledge to plan autonomously and make informed decisions that are applicable to the individual situations that they face in their quest to provide effective TD services. The ability to ask 'why' and understand what is best in any given circumstance is a valuable commodity.

Furthermore, the limitations within the interview procedure and the nature of what was being asked of the participants (both coaches and athletes alike) meant that remaining focussed on investigating what these people did and why, was crucial. For example, it was evident and explicit in chapter 5 that many coaches did not 'do' everything they spoke of as being effective practice. This occurred for a variety of reasons, sometimes it was the contradictory pressures of the job, for example, although they knew that a long term approach was necessary, if their team did not win at the weekend they would be out of a job. Some other reasons were related to the lack of resources or time, for example, parent education was considered crucial, but wasn't done because there was not enough staff or funds to allow for such a 'luxury'. Either way, a sole focus on what was done may have missed such issues, where a focus on unpacking understanding and declarative knowledge of what effective practice is, revealed much more rich and useful data.

Lastly, the nature of effective TD has proven to be complex and the features identified interrelate with one another in such a way that a certain depth and richness of understanding is valuable in adding value and usefulness in applied settings. Indeed, this was outlined in the guidelines themselves, identifying the nature of effective TD as 'integrated, holistic and systematic'. This seems to fairly represent the extent of the complexity of the many practical challenges that talent developers face when designing their TDEs (cf. Abbott et al., 2005). As an example, it is clear that understanding the mechanisms underpinning why people get stressed and how it affects performance (e.g., James & Collins, 1997; Smith, Bellamy, Collins, & Newell, 2001; Wilson, Smith, & Holmes, 2007) is far more informative and useful in an applied sense, than only knowing what situations and factors people find stressful (Gould et al., 1993; Noblett & Gifford, 2002). This argument forms some of the rationale behind the required focus on declarative knowledge. Indeed, a purely grounded theory approach would identify what happens and then look to interpret meaning, whereby a subtle focus in the methodology through chapters 3 to 5 of this thesis is to also examine the participants' perceptions of meaning during the data collection process itself.

The triangulation of evidence was considered a crucial feature of this work because it provided a means to provide greater reliability of the assessment procedure (e.g., Freeman & Lewis, 1998) increasing the likelihood of providing a complete picture of the key features of effective TDE procedures. Furthermore, it enabled insight into up-to-date and culturally specific information regarding the development process, shown to be important in chapter 2. In line with the comments

earlier, given the complexity of TD and the limitations of interviews, reliance on one aspect of evidence would perhaps lead to incomplete understanding.

Finally given that the generic nature of TD was highlighted by Bloom (1985), a concerted effort was made to incorporate a broad spectrum of sports within the development of the guidelines. This included traditional male and female sports, ranging from individual to team sports, from very technical to very physically oriented sports. Indeed, the generic nature of guidance for TD was a key focus through chapters 3, 4 and 5 which proved to be a strong component across sports and genders. While the external validity is a consistent issue within qualitative research, it was necessary to make every effort to attempt to deal with it, in order to facilitate the applicability of the emerging results to the broader sport community.

6.2 Where Next

Chapters 3, 4 and 5 and the associated systematic qualitative analysis procedures (including both inductive and deductive approaches), has provided a substantial evidence base in accomplishing objective 2 of this thesis. It also provided a significant foundation for the development of a TDE measurement tool. For example, typically researchers will only consult the literature in order to identify potential items for a 'tool' (e.g., Zervas, Stavrou & Psychountaki, 2007), but sometimes also consult either 'clients' or experts through focus group or individual interviews (AERA, APA, & NCME, 1999). For example, Johnston, Leung, Fielding, Tin, and Ho (2003) used a focus group of 10 students, in addition to a literature search, to help identify important themes and items. Walker and Fraser (2005) sent a preliminary set of items to a panel of experts for comment before finalising the items.

However, the expert and client consultation appears to be normally used exclusively for face and content validity checks of the items that have been developed.

In contrast, this thesis has consulted the literature and provided a comprehensive world-wide review presented as a desk top study utilising content analysis to identify key themes. This was then followed by the open ended interviewing of 16 experts, and 43 developing athletes (or 'clients') followed by systematic analysis following established qualitative procedures. The nature and depth of this foundation is likely to enable behaviourally locked items to 'fall out' of the data to form the first stage of item generation for a TDE tool. Furthermore, as with typical questionnaire development procedures, a standard approach will be used in order establish the content validity, face validity, comprehensibility and comprehensiveness (Johnston et al., 2003) of the items within the tool. This will include expert and client consultation (e.g., Terry, Lane, Lane, & Keohane, 1999).

The established procedure to follow the item generation in the development of a questionnaire is to carry out an EFA (e.g., Johnston et al., 2003; Terry et al., 1999; Walker & Fraser, 2005; Zervas et al., 2007). This was perhaps particularly pertinent in this case because of the emerging complexity and apparent interdependent nature of the TD processes. The need to investigate the extent to which a concise factor structure exists is crucial helping to identify underlying themes and examine the psychometric properties of the tool. It will also enable the most concise, user friendly and effective way to disseminate 'clustered' features of effective practice, and form the basis of the structure of a tool which will enable effective monitoring, assessment and evaluation of practice in applied settings.

Finally, while there has been consistent support for these guidelines from literature, experts and those involved in the process themselves, there has been no quantitative evidence presented which has tested the extent to which these guidelines are causative of the effective development of young sports people into successful senior athletes. While the crucial indicator of effective TD is the conversion rate of 'potential to success' through a system, this does take time and is open to biases such as quality of initial talent base. If key process features were found to be strongly linked to favourable outcomes, it would provide an evidence based and process focus for effective TD practice, allowing careful and considered monitoring and evaluation of environments before the 'goods' are produced.

As such, it will be important to examine the relative importance of the identified factors. If these guidelines do represent best practice, then they should be able to discriminate between effective and less effective practice or indeed, influence change that would lead to better TD outcomes. While it would be ideal to test the discriminant validity through long term intervention work that assessed TD outcome changes over time (throughput of young athletes within a TD system), this was considered beyond the scope of this thesis. As such, objective 4 of this thesis required the tool to undergo a preliminary discriminate validity testing through a DFA based on comparison of the questionnaire scores of athletes within effective and less effective TDEs. These final stages of testing using quantitative research methodologies aim to strengthen the applied value and validity of the first stages of work. As such, chapters 7 and 8 aim to satisfy objectives 3 and 4.

CHAPTER 7 – DEVELOPMENT AND VALIDATION OF THE TALENT DEVELOPMENT ENVIRONMENT QUESTIONNAIRE (TDEQ) FOR SPORTS

7.1. Introduction

Chapter 6 provided a timely summary and reflection of the first stage of this programme of research, which comprised of three phases of work. It also provided an overview of the required direction for the next stage, whose purpose was to develop the wider validity and practical application of the guidelines. This was considered best accomplished through the development and validation of a questionnaire (TDEQ) that could measure the extent to which key features of effective TDEs were apparent within any particular environment. While there are many advantages to developing a 'questionnaire for coaches', it was decided that the TDEQ would, as the initial development within the scope of this PhD, be designed to measure the extent to which the 'clients' of the TDE (i.e. developing athletes) perceived key features of effective TD practice to be part of their experience (see Figure 7.1.).

This tool aimed to build a useful link between evidence and practice, responding to the apparent problem in the UK of a lack of empirical base and practical guidance for effective TD. Reflecting good practice in the development of new scales (e.g., AERA, APA, & NCME, 1999; Johnston et al., 2003; Terry et al., 1999; Walker & Fraser, 2005; Zervas et al., 2007) the chapter reports the process in two phases. The first phase involved the generation of questionnaire items with clear content and face validity. The second phase explored the factor structure and reliability of the TDEQ. As such, the format of this chapter mirrors these two aims of

development and validation. 1) Item justification and generation; and 2) EFA and reliability properties.

7.1.1 Phase 1

The purpose of Phase 1 was to construct a questionnaire to assess the extent to which certain experiences featured within an athlete's development. The identification of the general content of the questionnaire was carried out through standard guidelines (AERA, APA, & NCME, 1999). This involved a review and content analysis of literature considered relevant to TDEs. The criteria used to guide the literature search required the work to be empirically based and relevant to one or more of the following areas; the aims of effective TD; the needs and experiences of young developing athletes; and/or the design and operation of environments that provide for the realisation of potential. The search yielded 152 papers which were then subject to systematic content analysis that led to the emergence of 22 key themes (see Figure 3.1.). Second, 16 TD experts working within the UK were individually interviewed (approx. 120 minutes each), and the subsequent data was analysed both inductively and deductively. Third, 43 developing athletes were individually interviewed (approx. 45 minutes each), and again the data was analysed inductively and then deductively against the backdrop of the emerging themes. This resulted in a finalised list of 22 themes representing key features of effective TD practice, which would be used to form the evidence base the development of items.

A four step approach was used to develop and select items (Johnston et al., 2003). First, an initial list of 135 items, spanning the 22 themes (see Figure 5.2.) was developed from the foundations that emerged from the process outlined above. Second, a panel of experts were asked to assess the preliminary questions and

themes, and provide structured comments with respect to face validity, content validity, comprehensibility and comprehensiveness within a series of workshops. This panel consisted of four qualified (chartered and/or BASES accredited) practicing sport psychologists, all experienced academics, two of which were academic professionals with extensive experience of questionnaire development. Furthermore, 12 individuals, across two individual sports and two team sports, who had formal responsibilities for TD within their sport in the UK were also consulted through a similar workshop format. The majority of these had also been former international athletes and coaches.

This process led to some grammatical changes, and the reduction of the items to 106 (where four categories had been merged to leave 18 key themes). The experts were divided into sub-groups of four or five. The sub-groups looked at the overall structure of the themes and then each took responsibility for assessing five or six themes and their associated items and making recommendations for change as deemed necessary. Subsequently, changes were made if all members of a sub-group agreed and then presented a successful rationale (i.e. accepted by all) to the rest of the panel.

Thirdly, two separate groups of developing athletes (within a broad age range of most 'developing athletes' within Bloom's Development Stage) were then subsequently asked to fill out the questionnaire and comment on the comprehensibility, relevance and similarity of the items in the questionnaire (cf. Johnston et al., 2003). Athletes were not specifically asked to advise on the comprehensiveness of the items as their limited experience was considered likely to restrict their appraisal of the full range of relevant issues.

The first group consisted of thirty-two 16-19 year old rugby players and the second group consisted of 50 rugby players aged between 13-20 years (all involved at a select level). The first group had coach helpers and the second group had both parent and coach helpers present. After the questionnaires were filled out, discussion took place in relation to any missing answers and feedback from the players, parents and coaches regarding all questions. In order to minimise unnecessary, ambiguous or poorly written questions and based on the feedback and discussion sessions, the questionnaire was reduced the set to 68 items. However, it was important to retain at least three items per 'theme' (Bollen, 1989), which occurred naturally through the feedback, without any artificial intervention.

The loss of 38 items through the last stage of item generation can be explained due to the different roles of the expert panel and athlete groups. While the main role of the experts was to assess the face validity, content validity, comprehensibility and comprehensiveness, the athletes remit included identifying questions which seemed to them irrelevant, were very similar in nature or incomprehensible to them at their age. However, even though these remits were different, the sizable reduction in items in some themes was seen as a potential cause for concern. Accordingly, content and face validity were subjected to an additional check. This final stage of the process involved the 68 questionnaire items and questionnaire structure (i.e. themes) being sent to 10 of the development coaches involved in the coach interviews (chapter 4) for feedback based on face validity, content validity, comprehensibility and comprehensiveness. No subsequent changes were required.

The final version of the TDEQ prior to the EFA consisted of 68 items and utilised a six point likert scale. Anywhere between three and nine likert points is considered appropriate (Bass, Cascio, & O'Connor, 1974) for such questionnaires, although, there has been wide discrepancy of advice over time (Chang, 1994). As such, the TDEQ provided a three point range of discrimination for both positive and negative choices (i.e. strongly agree, agree, agree a little bit, disagree a little bit, disagree, & strongly disagree), which ensured that athletes could not 'sit on the fence in the middle ground', by selecting an option such as 'neither agree or disagree'. This central tendency or 'fence sitting' can be a problem if respondents are indecisive (Buckley & Williams, 2002). Also, given that the nature of the questions related to the extent to which they had experienced something, neutral response was considered inappropriate.

There were 15 negatively worded questions to counter acquiescence (Ray, 1979), while there were instructions for the researcher to outline to the athletes filling in the TDEQ that their answers would remain confidential and the need for honesty and concentration when filling out the questionnaire. The initial form of the TDEQ included an instruction page and a section for demographic information, followed by 68 items and took between 15 and 25 minutes to complete (full TDEQ included in Appendix 4).

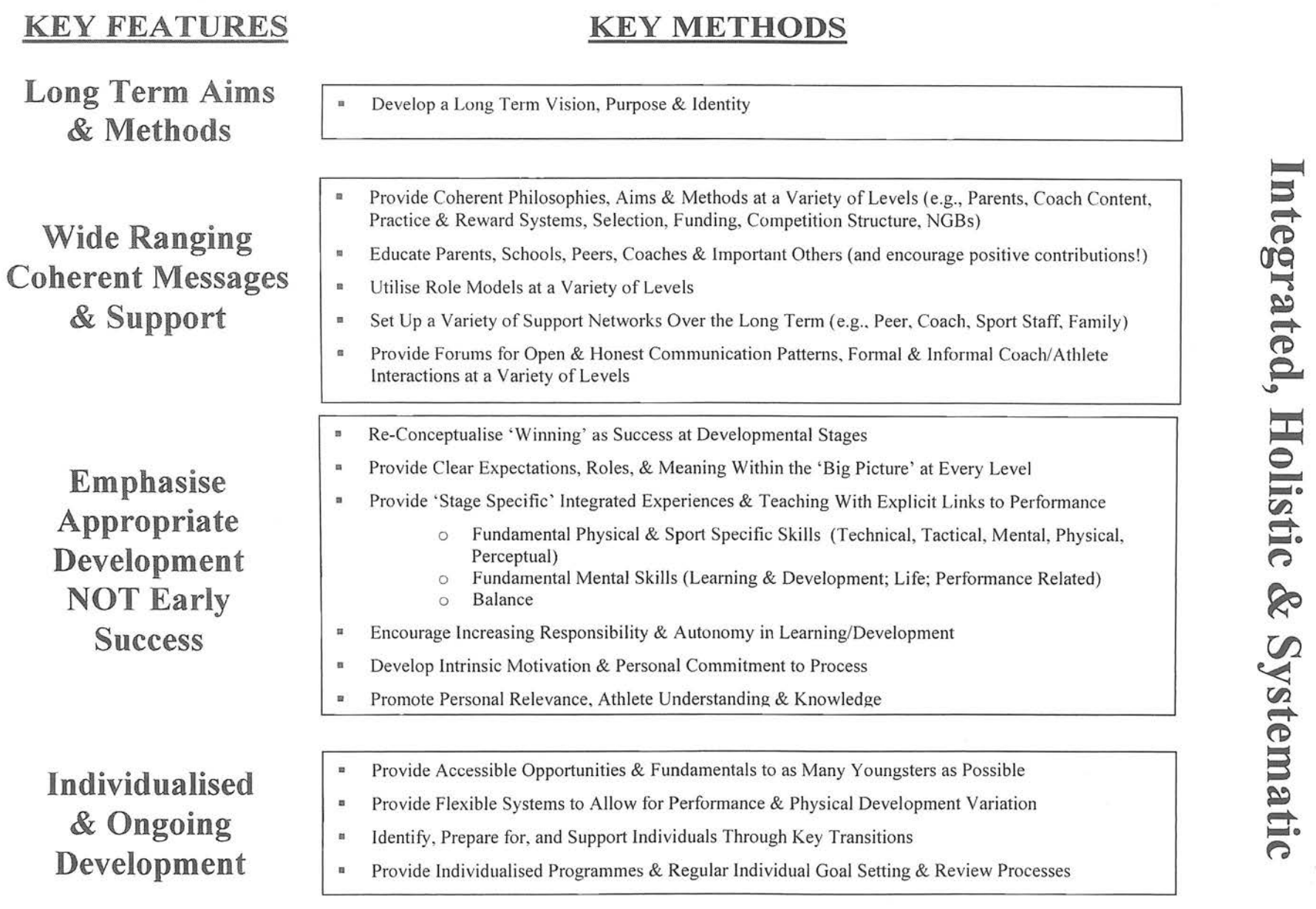

Figure 7.1. Key features of effective TDEs post content and face validity checking by expert talent developers

7.1.2 Phase 2

The purpose of the second phase was to explore the factor structure of the instrument through an EFA and assess the internal consistency of the ensuing factors. This was carried out through the analysis of answers provided by developing athletes in real world development environments.

7.2 Methods

7.2.1 Factor Analysis

The statistical package for Social Sciences (SPSS: version 14) was used to examine the factor structure of the TDEQ. The emerging factor structure provided insight into the latent factors underpinning the TDEQ and allowed important items to be retained and interpreted. The specific approach utilised, principal axis factoring extraction (PAF), is a factor analysis procedure that seeks the least number of factors which account for the common variance of a set of variables only. By contrast, more common procedures such as the principal components analysis can show inflated relationships due to utilising both common and unique (specific plus error) variance in a set of variables. In support of this approach, Widaman (1993) noted, that principal component analysis should not be used if parameters reflecting latent constructs or factors wish to be obtained. Accordingly, a PAF factor analysis was used.

In order to improve the interpretation of the data, an oblique with direct oblimin rotation was selected, instead of an orthogonal rotation, due to the theoretical grounds that the factors were likely to be correlated (see Figure 3.1. and section 3.3 for further information), and also due to the naturalistic nature of the data (Field, 2005). Theoretically, this type of rotation should render a more accurate, and

reproducible solution given the circumstances (Costello & Osbourne, 2005), and provide insight into these potential inter-relationships. As there is no widely preferred oblique rotation, the default Delta and Kappa values were used (Fabrigar, Wegener, MacCallum, & Strahan, 1999) in order to standardise the extent to which factors were allowed to correlate.

7.2.2 Sample Size

There has been a great deal of debate over what constitutes an adequate sample size in EFAs and the subsequent factor loading required to be considered significant. Having 300 or more cases is recommended by a number of academics (Comry & Lee, 1992; Kass & Tinsley, 1979; Tabachnick & Fidell, 2002), with at least a ratio of 4:1 of subject to item (Fabrigar et al., 1999). For this investigation, the Kasier-Meyer-Olkin of sampling adequacy (KMO) provided another check for sampling adequacy (Hutcheson & Sofroniou, 1999), and other important data screening techniques are used to check the appropriateness of the data, such as Bartlett's Test of Sphericity to test for an adequate level of correlation between items, and tests of multi-collinearity to examine the possibility of items being too well correlated. However, assuming 'good data', with a sample size above 300, Stevens (1992) suggests 0.298 as the level of loading to be considered significantly correlated with a factor, where cross loading items are dropped.

The criteria used for the number of factors to be retained included the scree test (Cattell, 1966); a preference for simple, clean structures over complex ones (Costello & Osbourne, 2005; Thurstone, 1947), the magnitude of the Kaiser-Guttman eigenvalue (minimum required over 1.0) (Cattell, 1966), and the interpretability of the groups (Harman, 1976). This combination of techniques was employed because

no single technique has been shown to be accurate over a wide array of circumstances (Fabrigar, et al, 1999; Ford, MacCallum, & Tait, 1986). In particular, the commonly used Kaiser-Guttman eigenvalue test is generally speaking only accurate when the number of variables is less than 30 and the resulting communalities are greater than 0.7, or a sample size of 250 and average communality above 0.6 (Field, 2006, p633).

Finally, to test the internal consistency of the TDEQ and its factors, Cronbach's Alpha Coefficient was calculated, whereby a value of above 0.7 was considered good (Tabachnick & Fidell, 1996), and anything above 0.6 was considered adequate only if there were a small number of items (Nunnally & Bernstein, 1994), due to the underestimation of scale item intercorrelation this can have.

7.2.3 Participants

Three hundred and fifty five athletes volunteered to participate. Consent was gained from the coaches (and parents in the event of the youngsters being under 16) and from the athletes themselves if they were over 16. The first part of the TDEQ asked for demographic data from the participants, including age, gender, sport, and club. This consisted of 262 males and 93 females aged between 11 and 21 (mean 14.18 SD 2.71). This purposeful sample of athletes was involved at a junior elite level in team and individual sport (swimming 40%, rugby and football 60%). These sports were chosen in order to maintain a spread of different types of sport, in line with efforts to develop the generic applicability of the TDEQ. While it is acknowledged that CFA would be required in future work to assess the extent to which similar factor structures exist across sports, it was considered appropriate to

use a multi-sport sample in the EFA. The multi-sport nature of this sample must be considered carefully if generic structures do not exist in future work.

In line with the standard of performer and 'excellence' environment (as opposed to participation) that the TDEQ assesses, the participants were considered to be in Bloom's (1985) development stage. That is, participants were recruited as elite junior athletes with potential to become elite at a senior level by virtue of their selection into either a regional elite player development squad or into a professional sport club academy.

7.3 Results

7.3.1 Exploratory Factor Analysis

The results of Bartlett's test of sphericity was significant (X^2 = 8091.296; *df* = 2278; $p < 0.0001$) indicating that there was adequate correlation between the variables and therefore that the EFA was appropriate. The Kaiser-Meyer-Olkin measure of sampling test revealed significant results (KMO = .902; P<0.001), providing further evidence that the sample size was adequate for factor analysis (Sharma, 1996). In addition, the anti-image correlation matrix was used to assess the sampling adequacy of individual variables, where any score above 0.5 warrants retention. The scores for the 68 items ranged from 0.521 to 0.955 and again highlighted the appropriateness of the sample size.

The communalities of the items ranged from 0.225 to 0.663 (mean item communality = 0.455), providing further evidence for the use of multiple criteria factor extraction. Indeed, significant attention was given to the Scree Plot and the subsequent search for the cleanest factor structure, due to the difficulty in pinpointing the inflexion in the curve. The cleanest factor was assessed through three criteria 1)

item loadings above 0.298; 2) no or fewest cross-loadings and 3) no factors with fewer than 3 items (Costello & Osbourne, 2005). This identified a 12 factor structure, with Eigen Values ranging from 15.355 to 1.270, accounting for 51% of the total explained variance. The factor loadings ranged from 0.294 to 0.634 across the 12 factors (where .01 variance was allowed to ensure no unnecessarily lost items; Field 2006), with 2 cross loaders. Twelve items were dropped either due to low loadings or cross-loading.

7.3.2 Internal Consistency

The internal consistency of the whole instrument and separately for each scale was assessed through Cronbach Alpha. The internal consistency for the whole TDEQ was excellent at 0.91 (Tabachnick & Fidell, 1996), and for each subscale the mean correlation was .569 with Factor 1 to Factor 12 respectively .864; .718; .745; .451; .586; .681; .398; .434; .385; .507; .709; .345. Two items were dropped due to poor internal consistency, and while the TDEQ and a whole, and Factors 1, 2, 3, 6, and 11 showed adequate internal consistency, Factors 4, 5, 7, 8, 9, 10 and 12 did not. These data are summarised in Table 7.1.

Table 7.1

Factor Structure of the TDEQ Emerging from an EFA

Note. Factor loading < .288 are not reported in the table

	Factor Loadings											
TDEQ Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10	Factor 11	Factor 12
Qu12	.630											
Qu10	.534											
Qu40	.523											
Qu54	.517											
Qu24	.391											
Qu20	.378											
Qu36	.364											
Qu16	.335											
Qu50	.321											
Qu26	.301											
Qu37	.296											
Qu33		.573										

Qu35		.569										
Qu32		.484										
Qu44		.356										
Qu15		.331										
Qu19		.316										
Qu30			-.500									
Qu8			-.479									
Qu29			-.365									
Qu48			-.317									
Qu2			-.312									
Qu5			-.294									
Qu4				.463								
Qu38				.349								
Qu46				.322								
Qu53					.523							
Qu43					.483							
Qu45					.482							
Qu39					.315							
Qu11						.623						
Qu21						.531						
Qu42						.371						
Qu49						.305						
Qu27							-.512					
Qu1							-.389					
Qu52							-.328					
Qu6								.458				
Qu9								.406				
Qu25								.355				
Qu3									.481			
Qu14									.320			
Qu22									.304			
Qu51										.421		
Qu13										.397		
Qu47										.346		
Qu31										.343		
Qu18											.634	
Qu7											.480	
Qu23											.357	
Qu28											.295	
Qu34												-.391
Qu41												-.338
Qu17												-.315

7.3.3 Relationships between the Factors

Graham, Guthrie, and Thompson (2003) recommended reporting both the pattern matrix in Table 7.1., and the structure matrix in Table 7.2. While the pattern matrix reveals the unique contribution of a variable to a factor, the structure matrix also reveals shared variance. This can highlight the extent to which there are any relationships between factors. On a theoretical level dependence between factors does not cause concern (Field, 2006) and, where relationships exist, this actually allows more meaningful interpretation than an orthogonal representation. Following procedures outlined in Field (2006), it was concluded that the data revealed a

relationship between Factors 1, 2, 3, 6, 7 and 11, and also a relationship between Factors 5 and 9. While Factors 4, 8, 10 and 12 were relatively independent factors.

Table 7.2

Structure Matrix of the TDEQ Exploratory Factor Analysis

TDEQ Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10	Factor 11	Factor 12
Qu12	0.747	0.334	-0.298			0.311	-0.295		0.343		0.471	
Qu10	0.691					0.462			0.322		0.458	
Qu54	0.616				0.381		-0.332				0.323	
Qu50	0.612	0.331	-0.348		0.320	0.470	-0.366				0.507	
Qu40	0.592				0.315	0.340						
Qu37	0.533		-0.416		0.318	0.358					0.451	
Qu36	0.531		-0.397								0.450	
Qu20	0.521				0.318						0.444	
Qu24	0.498	0.304										
Qu26	0.488		-0.353		0.371	0.362						
Qu16	0.481					0.420					0.443	
Qu35		0.612										
Qu32		0.572									0.325	
Qu33		0.558										
Qu19		0.455	-0.292								0.339	
Qu44	0.342	0.448				0.311	-0.335		0.360	-0.322	0.338	
Qu30			-0.603			0.347						
Qu8			-0.572			0.344			0.384			
Qu48	0.366	0.397	-0.515			0.418	-0.363			-0.318	0.385	
Qu29	0.362	0.348	-0.513		0.351	0.349					0.402	
Qu15	0.374	0.459	-0.478						0.322		0.392	
Qu2	0.324	0.300	-0.449						0.298		0.412	
Qu38		0.309	-0.446	0.358							0.407	
Qu5	0.302		-0.381								0.318	
Qu4				0.476								
Qu46				0.350								
Qu43					0.564				0.324			
Qu53	0.298				0.558							
Qu45					0.487							
Qu39					0.415							-0.292
Qu11						0.615						
Qu21	0.415					0.603						
Qu42	0.376	0.396			0.297	0.541	-0.321				0.509	
Qu27							-0.479					
Qu52	0.463	0.386	-0.305			0.355	-0.464				0.431	
Qu1							-0.435					
Qu31							-0.407			0.354		
Qu6								0.478				
Qu9								0.398				
Qu25								0.372				-0.366
Qu3									0.521			
Qu14	0.322				0.300				0.401		0.297	
Qu22									0.366			
Qu51										0.438		
Qu13										0.421		
Qu47		0.334								0.346		
Qu18	0.334		-0.375								0.696	
Qu23	0.484	0.405	-0.346			0.389	-0.349				0.596	
Qu28	0.473	0.331	-0.330			0.374					0.527	
Qu49	0.505					0.505	-0.380				0.509	
Qu7											0.498	
Qu34						0.309						-0.442
Qu17	0.328	0.339										-0.388
Qu41												-0.348

7.3.4 Interpretation of Factors

While factor analysis identified latent factors within a group of items, it does not provide an interpretation of the meaning of those identified themes. An accepted practice in psychometrics is to identify this meaning by consideration of the pivotal items (those which load most heavily) within any factor. Where the content of these pivotal items is consistent with the hypothesised conceptual structure; it provided evidence of a valid interpretation (Hawthorne, Richardson, Osbourne, 1999). Based on these guidelines the 12 factors were interpreted as follows.

Factor 1: **Clarity of Training Focus**. Eleven items within Factor 1 related to the degree to which athletes were helped to understand their sports development and themselves, the extent to which quality training, basic skills and responsibility were encouraged and the clarity and organisation with which coaches communicated and set out required expectations.

Factor 2: Personal Interest & Communication. Six items within Factor 2 related to the personal interest of the coach in the development, well being and mental toughness of the athlete and the extent to which they communicated with other significant influences.

Factor 3: Individual Centred Support Network. Six items within Factor 3 related to having a range of accessible support staff to help with the needs and development of the individual athlete for sport and life.

Factor 4: Balanced Life & Sport Development. Three items within Factor 4 related to the extent to which support was given for continued education and participation in other activities

Factor 5: Athlete & Parent Commitment. Four items within Factor 5 related to the extent to which athlete dedication and parental support were promoted.

Factor 6: Individually Focussed Development. Four items within Factor 6 related to the extent to which physical preparation and a variety of different skills and attributes were promoted at an individual level.

Factor 7: Integrated Long Term Agenda. Three items within Factor 7 related to the extent to which long term development was a clear agenda and how consistently this was communicated and highlighted through training and competition to the athlete.

Factor 8: Preparation for Future Challenges. Three items within Factor 8 related to the extent to which performers understand the likely challenges in the future and are helped to be prepared for such challenge and adversity, particularly through integration with more experienced performers.

Factor 9: Ongoing Development Opportunities. Three items within Factor 9 relate to the extent to which support, advice and opportunities would be available regardless of fitness or performance levels of the athlete.

Factor 10: Consistently Reinforced Standards. Four items within Factor 10 relate to the extent to which required standards are reinforced particularly through quality competition experiences and the clarity and coherent pressure to behave as required in training, competition and through recovery periods.

Factor 11: Understanding Progression to Senior Level. Four items within Factor 11 relate to the extent to which specific focus is given to providing clarity and development in preparation for the transition to elite level.

Factor 12: Challenging & Supportive Environment. Three items within Factor 12 relate to the extent to which athletes are challenged through the opportunity to train with players of a higher/elite level and are helped to be mentally prepared and supported for this. Table 7.3 below outlines the factors of the TDEQ and their associated questions.

Table 7.3

Items in the Talent Development Environment Questionnaire (TDEQ)

Response choices are strongly agree, agree, agree a little bit, disagree a little bit, disagree, strongly disagree

Scale	Items
Factor 1: Clarity of Training Focus (11 items)	12. My coach is good at helping me to understand what I am doing and why I am doing it 10. My coach is good at helping me to understand my strengths and weaknesses in my sport 40. My training sessions are normally beneficial and challenging 54. My coach emphasises the need for constant work on fundamental and basic skills 24. My coaches and those who support me give me straight answers to my questions 20. The more experienced I get the more my coach encourages me to take responsibility for my own development and learning 36. Feedback I get from my coaches almost always relates directly to my goals 16. My coach constantly reminds me what he/she expects of me 50. My coach actively develops my understanding of my sport development (e.g., technical, tactical, mental, physical, lifestyle, sport process) 26. Those who help me in my sport seem to be on the same wavelength as each other when it comes to what is best for me (e.g., coaches, physiotherapists, sport psychologists, strength trainers, nutritionists, lifestyle advisors etc) 37. Organisation is a high priority to those who develop my training programme
Factor 2: Personal Interest & Communication (6 items)	* 33. My coach rarely takes the time to talk to other coaches who work with me * 35. My coach rarely talks to me about my well-being * 32. I don't get much help to develop my mental toughness in sport effectively 44. My coaches make time to talk to my parents about me and what I am trying to achieve 15. My coach takes my whole life situation into account when planning my programme * 19. My coach doesn't appear to be that interested in my life outside of sport
Factor 3: Individual Centred Support Network (6 items)	30. Currently, I have access to a variety of different types of professionals to help my sports development (e.g., physiotherapist, sport psychologist, strength trainer, nutritionist, lifestyle advisor etc)

	8. I can pop in to see my coach or other support staff whenever I need to (e.g., physiotherapist, psychologist, strength trainer, nutritionist, lifestyle advisor etc) 29. My training programmes are developed specifically to my needs 48. My coaches talk regularly to the other people who support me in my sport about what I am trying to achieve (e.g., physiotherapist, sport psychologist, nutritionist, strength & conditioning coach, life style advisor etc) 2. I am being trained to be ready for almost anything that is thrown at me in sport and life 5. All the different aspects of my development are organised into a realistic timetable for me
Factor 4: Balanced Life & Sport Development (3 items)	* 4. My school/college/university don't really support me with my sport when I need it 38. My coaches ensure that my school/uni/college understand about me and my training/ competitions 46. I am encouraged to participate in other sports and/or cross train
Factor 5: Athlete & Parent Commitment (4 items)	53. I am constantly reminded that my personal dedication and desire to be successful will be the key to how good a performer I become 43. I am involved in most decisions about my sport development 45. My parents are there to support me in many different ways if I need it (e.g., talk to me, financial, travel, organisation, emotional) 39. I am regularly told that winning and losing just now does not indicate how successful I will be in the future
Factor 6: Individually Focussed Development (4 items)	11. Strength and conditioning training is specifically incorporated into my programme which is helping me get strong and fit for my sport (e.g., weight training, press ups, sit ups, body work, circuits etc) 21. My development plan incorporates a variety of physical preparation such as fitness, flexibility, agility, co-ordination, balance, strength training etc 42. I regularly set goals with my coach that are specific to my individual development 49. My coach plans training to incorporate a wide variety of useful skills and attributes, for example, techniques, physical attributes, tactical skills, mental skills, decision making
Factor 7: Integrated Long Term Agenda (3 items)	* 27. Developing performers are often written off before they have had a chance to show their real potential 1. My coaches care more about helping me to become a professional/top level performer, than they do about having a winning team/performer right now 52. My coach often talks to me about the connections/overlap between different aspects of my training (e.g., technical, tactical, physical & mental development)
Factor 8: Preparation For Future Challenges (3 items)	* 6. It is unusual to get specific training to teach us how to make good decisions under pressure * 9. I am rarely encouraged to plan for how I would deal with things that might go wrong * 25. I don't often get any help from more experienced performers
Factor 9: Ongoing Development Opportunities (3 items)	3. If I got injured I believe I would continue to receive a good standard of support 14. The advice my parents give me fits well with the advice I get from my coaches 22. If it didn't work out for me here, there are other good opportunities that would help me to keep progressing in my sport

Factor 10: Consistently Reinforced Standards (4 items)	* 51. I feel pressure from my mates in sport to do things differently from what my coaches are asking of me * 13. I struggle to get good quality competition experiences at the level I require * 47. I am not taught that much about how to balance training, competing and recovery * 31. The guidelines in my sport regarding what I need to do to progress are not very clear
Factor 11: Understanding Progression to Senior Level (4 items)	18. My coach and I talk about what current and/or past world class performers did to be successful 7. Me and my sports mates are told how we can help each other develop further in the sport 23. My coach and I regularly talk about things I need to do to progress to the top level in my sport (e.g., training ethos, competition performances, physically, mentally, technically, tactically) 28. My coach and I often try to identify what my next big test will be before it happens
Factor 12:Challenging & Supportive Environment (3 items)	34. I have the opportunity to train with performers who are at a level I am aspiring to * 41. I get the impression that my parents get frustrated if I lose * 17. My coach doesn't often mention mental skills, such as imagery, positive thinking, coping with disappointment, competition routines, goal setting etc

While the interpretation of the individual factors had been carried out independently, the oblique rotation within the EFA also highlighted some relationships between factors. Now the interpretation of individual factors was complete, it was possible to present an overview of these more subtle relationships. Factors 1, 2, 3, 6, 7, and 11 showed a relationship, as did factors 5 and 9 through the structure matrix analysis and on consideration of them as groups (Hawthorne et al., 1999), represent "Individualised & Coherent Long Term Agenda" (1, 2, 3, 6, 7 and 11) and "Commitment & Depth of Opportunities" (5 and 9). Factors 4, 8, 9, 10 and 12 appeared to be independent factors highlighting the separate features of "Balanced Life & Sport Development"; "Preparation For Future Challenges"; "Consistently Reinforced Standards"; and finally "Challenging & Supportive Environment". This is represented in Figure 7.2.

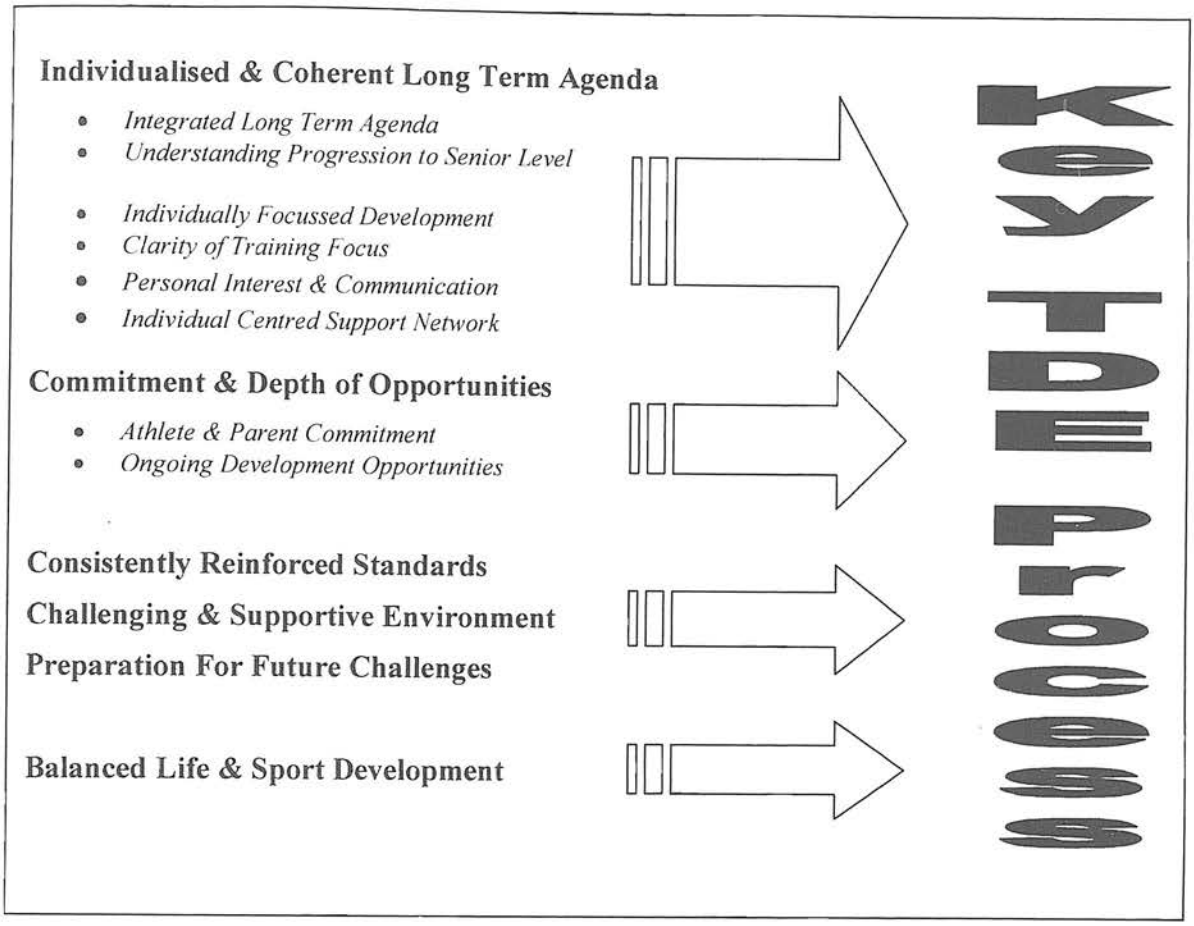

Figure 7.2 Key Features Emerged as Effective TDE Processes

7.4 Summary and Discussion

This chapter built upon chapters 3, 4 and 5, which presented evidence for generic features of effective TD processes. The need to develop a mechanism to help bridge the theory-practice gap was identified through the problems with current policy and practice. While the effectiveness of TDEs and/or coaches must ultimately be measured by the number of athletes that are churned through the system, using this outcome measure alone does little more than, at best, identify where good practice might occur. Of course, this also assumes talent is equally and randomly distributed amongst coaches and environments. As such, to enhance the effectiveness of knowledge dissemination and as a means to evaluate and monitor practice, process measures must also be utilised. As such, the purpose of this chapter was to develop a

valid TDEQ, explore its underlying factor structure and examine its psychometric properties, with the aim of providing a valid and reliable tool.

The study utilised thorough and standardised procedures to generate items and provide appropriate face and content validity checks. The subsequent EFA produced revealed a 12 factor structure solution. Fourteen of the 68 items were dropped, including 2 crossloaders, 10 low loading and 2 to increase the internal consistency of the scale leaving a 54 item solution. This new sample was used for further exploration which confirmed the 12 factor structure. This structure revealed an average number of items of 4.5 per factor with the lowest number being 3 items and highest 11, while Jackson and Marsh (1996) recommend the optimum number of items per factor in a short questionnaire being four. Importantly, Bollen (1989) cautioned using anything less than three. While highlighting the overall suitability of the item and factor structure, five of the 12 factors use only three items, a minimum requirement. Reliability analysis revealed that the TDEQ had excellent internal consistency (.92), with lower values occurring for individual subscales (mean .569), some of which were outlined as inadequate ratings. More specifically, the poor internal consistency of Factors 4, 5, 7, 8, 9, 10 and 12 (five of which have three items and two with four) may relate to the fact that these factors utilise fewer items. This is particularly likely when you consider that those with adequate reliability scores (Factors 1, 2, 3, 6 and 11) used between four and eleven items each.

Interestingly, the structure matrix of the EFA revealed relationships between the Factors 1, 2, 3, 6, 7 and 11, and also between Factors 5 and 9, where Factors 4, 8, 10 and 12 were independent. The relationship between the seven factors was interpreted to represent an over arching feature related to a clear progression, focus

and commitment to long term achievement supported at an individual level. This was named as 'Individualised & Coherent Long Term Agenda'. The other relationship between Factors 5 and 9 was related to the importance of athlete and parent commitment and ongoing opportunities and was named "Commitment & Depth of Opportunities". Both of these relationships and associated factors provided a clear separation from the other more independent features. This highlighted a further insight into the potential for a six factor structure, when considering both the pattern and structure matrices of the EFA, which essentially simplifies the nature of the latent variables.

Finally, it must be noted that both team and individual sports participants were used for this EFA. While this provided a level of generic application of the guidelines, it may also be masking some sport specific issues. As such, it will be important to carry out future multi-sample confirmatory factor analyses (CFA) (see Bentler, 1995) with different sporting groups to ascertain a better understanding of the generic nature of the TDEQ (Terry et al., 2003).

7.4.1 Relationships to the Literature

The interpretation of the 12 factors revealed some interesting features, all of which have support from other literature in the field. Factor 1, 'Clarity of Training Focus' was concerned with the development of athlete understanding, responsibility and quality practice through clear communication and expectations, which is heavily supported in the literature (Bloom, 1985; Csikszentmihalyi et al., 1993; Entwistle & Kozeki, 1985; Ericsson et al, 1993; Gould et al., 2002; Knowles, Holton, & Swanson, 1998; Siedentop, 1978). Factor 2 'Personal Interest & Communication' highlighted the need for a coach to show a personal interest in the development and

well being of individuals and the associated communication with significant others, again another factor supported in the literature. Indeed, Bloom (1985) highlighted this as one of the key ingredients of successful TD. Factor 3 'Individual Centred Support Network' identified the need for a wide variety of integrated support staff focussed on individual needs and holistic development (e.g., Durand-Bush & Salmela, 2002; Gould et al., 2002; Rees & Hardy, 2000). Factor 4 'Balanced Life & Sport Development' presented the need for help with balancing education and other activities within the programme (De Knop, Wylleman, Van Houcke, & Bollaert, 1999; Salmela & Moraes, 2003; Sinclair & Orlick, 1993). Factor 5 'Athlete & Parent Commitment' related to the need for dedication and ownership from the athlete and also dedication and commitment from the parents (Bloom, 1985; Cote, 1999; Ericsson, 2003). Factor 6 'Individually Focussed Development' highlighted the need for a wide variety of individualised physical and TTMP skills development (Abbott et al., 2002; Bloom, 1985; Burwitz, Moore, & Wilkinson., 1994; Csikszentmihalyi et al., 1993; Gould et al., 2002; Reilly, Williams, Nevill, & Franks, 2000; Simonton, 1999). Factor 7 'Integrated Long Term Agenda' identified the need for an integrated long term focus running through the whole system (Abbott & Collins 2004; Abbott et al., 2005; Collins, 2008; Gould et al., 2002). Factor 8 'Preparation for Future Challenges' highlighted the need for preparation and readiness for adversity and likely challenges (Abbott, et al., 2005; Lavallee, 2005). Factor 9 'Ongoing Support and Opportunities' revealed the need for support and opportunities regardless of performance or injury status (Abbott & Collins, 2002; Podlog & Eklund, 2007; Ward & Williams, 2003). Factor 10 'Consistently Reinforced Standards' presented the need for quality competition and clarity of training, competition and recovery needs

to consistently reinforce required behaviour and skills (Abernethy, Cote & Baker, 1999; Bloom, 1985; Cote 1999; Cote & Hay, 2002; Durand-Bush & Salmela, 2002; Starkes, 2007). Factor 11 'Understanding Progression to Senior Level' highlighted the need for clarity, understanding and preparation specifically for the transition to elite level (Cote & Hay, 2002; Durand-Bush & Salmela, 2002; Gould et al., 1982; Kreiner-Phillips & Orlick, 1993; Mcnamara, et al., 2006) and finally Factor 12 'Challenging & Supportive Environment' showed the need to challenge athletes through exposure to elite/high level training experiences accompanied with associated mental preparation and support (Bloom, 1985; Csikszentmihalyi et al., 1993; Côté, et al., 2006; Foster-Harrison, 1997; Pancoe, 1999; Veenman, 1995).

7.4.2 Relationships to Earlier Stages of this Thesis

The 12 factors shared similarities with the 18 key methods (see Figure 7.1.) that emerged from previous qualitative work, however, they provided a more concise and statistically based factor structure from which to work with. Indeed, the presence of a statistical relationship between Factors 1, 2, 3, 6, 7 and 11 and also 5 and 9, and the remaining 5 independent factors as outlined earlier, provided the possibility of an even more concise representation of the factors associated with the TDEQ and therefore effective development environments (see figure 7.2). Of course, while it is important to develop a concise factor structure, the discriminant validity of the TDEQ needed to be explored, in order to provide evidence that these guidelines and, in particular, these features as measured by the TDEQ can discriminate between good and not so good practice. This was the focus of chapter 8.

CHAPTER 8 – DISCRIMINANT VALIDATION OF THE TALENT DEVELOPMENT ENVIRONMENT QUESTIONNAIRE (TDEQ) FOR SPORTS

8.1. Introduction

Chapter 7 provided evidence for a systematically developed tool, the TDEQ, to measure the TDE experiences of development athletes. This process identified a number of items that represent the underlying structure of TD practice. A thorough examination of the content and face validity, comprehensibility and comprehensiveness of these TDEQ items was also presented. In order to examine statistically the latent structure of the TDEQ, reduce the items to a more manageable size without losing original information and assess the reliability and validity of the refined scales an EFA was completed. The resulting 54 item TDEQ represented a psychometrically valid tool to measure the experiences of developing athletes within their TDE.

However, the extent to which the TDEQ can discriminate between different quality TDEs is a crucial part of the assessment of its psychometric properties (Criterion Validity: Thomas & Nelson, 1990). Without a good level of this form of predictive and ecological validity, there would be serious doubts as to the extent of the practical application of the TDEQ as a tool. While there is evidence from qualitative work that the items within the TDEQ are associated with (or even predictive) of quality TD practice, quantitative evidence of the effectiveness and validity of the TDEQ tool in applied settings is required. This will provide a platform from which it can be used with confidence and as an assessment of the most important features for effective development.

Ideally, (and for future research) the criterion validity would be assessed through longitudinal tracking work, where TDEs could be assessed using the TDEQ and then monitored over time to gain evidence with regards to their TD productivity. Alternatively, longitudinal research could assess the impact of an intervention based from the TDE guidance, measuring its impact on both TDEQ scores and outcome measures of TD effectiveness. As such, conclusions could be drawn of the extent to which these TDE guidelines were genuinely causative of positive, tangible change. However, given the time and resource limitations of this thesis, preliminary validation of the TDEQ's predictive validity was gained through DFA; a technique common to validation studies (e.g., Raylu & Oei, 2004). This examined the extent to which the TDEQ could discriminate between developing athletes involved in high quality TDEs verses lower quality TDEs.

8.2 Method

8.2.1 Participants

One hundred and sixteen developing athletes were recruited to take part in this validation study. Fifty four of them were identified to be associated with a quality TDE and sixty two were identified as belonging to a lower quality TDE. This sample size is adequate as the minimum number of cases per group needs to exceed 20 (Tabachnick & Fidell, 2001). As outlined before, the first part of the TDEQ asked for demographic data from the participants, including age, gender, sport, and club. This showed that seventy one males and forty five females aged between 11 and 21 (mean 14.1 SD 2.67) were involved in the discriminative investigation. The athletes were involved at a junior elite level in one of two different sports (swimming 76.7%, rugby 23.3%). As with the other work in this thesis at least two diverse sports were

utilised to maintain the examination of genericity. In line with the standard of performer and 'excellence' environment (as opposed to participation) that the TDEQ assesses, the participants were classified in Bloom's (1985) development stage and had been identified as having long term potential within a development squad.

8.2.2 Rationale for the Classification of Quality TDEs

The athletes were asked to provide the name of their academy, club or region before filling in the TDEQ. From the available demographic data a number of athletes (n = 116) were assigned a group based on the quality of their TDE. The groups were identified as either 'Good Quality' or 'Lesser Quality' (TDE 1 and TDE 2 respectively) by suitable and independent assessors from each sport before the data collection began. These 'judges' included a Performance Director and a Governing Body representative, both with more than 20 years experience in their respective sports. Also, both of the assessors had been in charge of setting up either all or some of the development centres involved and had thorough knowledge of their day to day activities, their productivity and quality of talent base. This process provided the rationale and evidence for grading TDEs within each sport.

'Sport One' accounted for three 'TDE 1' and three 'TDE 2' quality environments associated with regional squads. The separation of these groups was based on rationale presented by the performance director relating to the identification of the quality of the set up of particular regions. This included specific reference to progression rates and the employment of a professional coach to develop the talent personally and organise, educate regional coaches and run the regional programmes. 'Sport Two' presented two 'TDE 1' and two 'TDE 2' quality academy environments and provided a written rationale for the quality of the academies which included data

of through put of academy players into senior representation since 2002, which backed up the opinion of the performance director (see Table 8.1). In all, ten TDE 'groups' were identified by the assessors within the two sports (one individual and one team sport, mixed gender and male respectively), five of which were classified as 'TDE 1' and five classified as 'TDE 2' standard, within each group were 54 and 62 athletes respectively.

Table 8.1

Quality of TDEs and Rationale for the Classification

	Higher Quality (TDE 1)		Lesser Quality (TDE 2)	
Sport Two	TDE 'G'	TDE 'H'	TDE 'I'	TDE 'J'
% Conv. since 2002	50%	35.1%	26.2%	22%

8.3 Results

The discriminant validity of the TDEQ was examined through a multivariate analysis of variance (MANOVA) and subsequent univariate statistics and a DFA. Preliminary analysis confirmed that there was a significant difference between the two groups (TDE 1 & TDE 2; $F(103, 12) = 5.716$, $P<0.0001$) in their scale scores on the TDEQ. Table 8.2 presents the means, standard deviations and significance levels from the subsequent univariate tests. The initial MANOVA has been said to 'protect' from subsequent analysis of variance (ANOVA) tests, because it avoids inflating the chance of type 1 errors through repeated tests (Bock, 1975). As such, it is advised to utilise both ANOVAs and DFA to fully understand the data (Field, 2006). The table below shows mean scores, standard deviations and the results of the associated effect sizes and significance values for individual TDEQ factors between the TDE 1 and TDE 2.

Table 8.2

PostHoc Univariate ANOVAs for TDE Quality and TDEQ factors

	TDE 1 Mean (SD)	TDE 2 Mean (SD)	Effect Size	Significance
Factor 1	2.20 (0.55)	2.39 (0.80)	0.14	P>0.05
Factor 2	3.00 (0.94)	3.54 (0.99)	0.27	P<0.01 **
Factor 3	3.09 (0.97)	2.91 (1.15)	0.08	P>0.05
Factor 4	3.14 (0.98)	2.99 (0.93)	0.08	P>0.05
Factor 5	1.99 (0.73)	2.16 (0.67)	0.12	P>0.05
Factor 6	2.25 (0.77)	2.35 (0.91)	0.06	P>0.05
Factor 7	2.72 (0.91)	3.09 (0.75)	0.22	P<0.05 *
Factor 8	3.15 (0.73)	3.28 (0.75)	0.09	P>0.05
Factor 9	2.27 (0.64)	2.35 (0.71)	0.06	P>0.05
Factor 10	2.52 (0.83)	3.24 (0.83)	0.43	P<0.001 ***
Factor 11	2.52 (0.83)	2.77 (0.10)	0.13	P>0.05
Factor 12	2.70 (0.94)	2.76 (0.93)	0.03	P>0.05
Overall TDEQ	2.63 (0.51)	2.82 (0.52)	0.18	P<0.05 *

The overall TDEQ revealed significant differences between the 'TDE 1' and 'TDE 2' groups, 10 of the 12 factors showed positive trends in the favour of 'TDE 1', while three of the factors were found to show significant differences between the groups. These were Factor 10 'Consistently Reinforced Standards', Factor 2 'Personal Interest & Communication' and Factor 7 'Integrated Long Term Agenda'. Interestingly, small effect sizes (0.1–0.3) were found for Factors 1 'Clarity of Training Focus', Factor 2 ' Personal Interest & Communication', Factor 5 'Athlete &

Parent Commitment', Factor 7 'Integrated Long Term Agenda', Factor 11 'Understanding Progression to Senior Level' and overall TDEQ and a medium effect size (0.3-0.5) for Factor 10 'Consistently Reinforced Standards'. The extent of the non-significant findings are perhaps unsurprising, given that they reflect structural or selection-related factors, and all environments tested were 'endorsed and directed' by the respective NGBs.

These issues notwithstanding, the DFA determined the ability of the TDEQ to predict the environment that the athletes belonged to. Given the expected unequal group sizes, a priori probabilities for each group were calculated from the outcome group size. The result indicated a significant discriminant function (Wilks's Lambda = 0.6, X2 (2) = 55.121, P<0.001) and a canonical correlation of 0.632. The 12 TDEQ Factors were able to correctly predict 81% of the players into the correct quality TDEQ environment (Table 8.3.).

Table 8.3

DFA - Predicted Group Membership

81.0% of original grouped cases correctly classified

	Predicted Group Membership	
	TDE 1 Prediction	TDE 2 Prediction
TDE 1 Group (54)	79.6% (43)	20.4% (11)
TDE 2 Group (62)	17.7 % (11)	82.3% (51)

Furthermore, consideration was given to the "canonical variate correlation coefficients (see Table 8.4), akin to factor loadings, which are argued to indicate the

substantive nature of the variates" (Field, 2006 p.612) by showing the extent to which each TDEQ Factor contributes to group separation (Bargman, 1970).

Table 8.4

Canonical Variate Correlation Coefficients

Factor 10	.582
Factor 2	.346
Factor 7	.280
Factor 1	.172
Factor 11	.164
Factor 5	.152
Factor 8	.114
Factor 3	-.101
Factor 4	-.099
Factor 9	.076
Factor 6	.073
Factor 12	.039

However, utilising only the higher and significant loading Factors 10, 2, and 7, 70.7% of the players were correctly classified into their respective quality TDEs (Table 8.5). As such, at least for the present data set, the take home message was that Factors 10, 2, and 7 can predict the quality of TDE experienced of 7 out of every 10 developing performers.

Table 8.5

DFA - Predicted Group Membership using Factors 10, Two, & Seven

70.7% of original grouped cases correctly classified

	Predicted Group Membership	
	TDE 1 Prediction	TDE 2 Prediction
TDE 1 Group (54)	68.5% (37)	31.5% (17)
TDE 2 Group (62)	27.4 % (17)	72.6% (45)

8.4 Summary and Discussion

The ultimate aim of effective TDEs is to produce top class, elite level performers. As such, the number of athletes that are turned into successful senior elite performers must be a key measure of effectiveness for any TDE and/or coach. However, in order to learn how to develop talent more effectively, or make changes and monitor the subsequent effects that this has on the quality of our talent development procedures, we must also examine TDEs with process measures.

The purpose of this chapter was to examine the ecological and criterion validity of the TDEQ. In other words, present evidence for the extent to which the TDEQ can discriminate between effective and less effective practice, in real world, applied settings. The results found that the TDEQ could accurately discriminate 81% of the developing athletes in relation to the quality of their TDE. Interestingly, only three factors were found to be significant predictors, and could predict TDEs with 71% accuracy. While effect sizes showed six factors to be important, the results challenge the notion that there are 12 important TDEQ factors. However, given the relatively small numbers of participants and TDEs examined, their status as

'approved' centres, and with consideration of the large amount of qualitative and empirical support for all the factors, these results may identify that the three / six factors hold a special and important role within the development process, but are not necessarily all encompassing. This clearly warrants further exploration. For example, Factor 3 (Individual Centred Support Network) and Factor 4 (Balanced Life & Sport Development), showed non significant trends towards lower values in lesser quality TDEs. While these represent very low effect sizes, it would appear to warrant further investigation into the importance or application of these items. This is perhaps particularly important for the issue of engaging in a balanced lifestyle at an 'excellence level' and may warrant some careful interpretation. For example, in chapter 4, it was apparent that while education was promoted as a necessity for a developing athlete, managing this environment so it is not counter productive (i.e., lots of alcohol consumption at University) is crucial. Furthermore, while it might be crucial at early stages, once someone has finished school, perhaps a re-analysis of an individual's needs is required. So the general application of this feature may require special attention specific to developmental stage and individual requirements, but certainly it should not be dismissed due to an apparent lack of statistical significance in the DFA with this sample.

In looking more specifically at the three significant items (Integrated Long Term Agenda; Consistently Reinforced Standards; Personal Interest & Communication), their importance may be due to the crucial need to maintain coherent aims throughout a system for consistent results to be gained over long periods of time, perhaps particularly important in TD where delayed gratification is crucial. Indeed, alongside the need for a clear and applied vision is the need to

consistently provide opportunities which reinforce the quality standards known to be required for achievement in 'excellence settings' and encourage the behaviours that facilitate and challenge people to develop further. This links closely with the importance of an appropriate 'ethos' evident in chapter 5.

Finally, the individual nature of people and development means that personal interest in individuals and communication with significant others may well be of crucial importance. These factors were crucial (and special) enough to have been shown to be significantly different between good and lesser quality TDEs in this study. Of course, the other features which showed some effects were Clarity of Training Focus; Athlete & Parent Commitment; and Understanding Progression to Senior Level, all of which have ample empirical evidence for their importance. Again, careful consideration and future work must focus on examining which features are most relevant for helping talented individuals get to and produce at a world class level. Regardless of the debate of which items are most important, the DFA has demonstrated that the TDEQ, as a whole, has an excellent ability to discriminate quality practice, highlighting the potential potency of this tool. While early evidence leads to the possibility of revealing 'more important' features, this warrants further exploration.

While there are methods of assessing coach behaviour and specific aspects of the coaching environment (e.g., motivational climate; Ames, 1992) being used successfully in practice (e.g., Morgan, Kingston & Sproule, 2005; Sproule et al., 2007), there is currently no tool which assesses the quality of the TDE holistically. As such, there are a number of potential applied uses for the TDEQ. These include evaluating practice, gaining formative feedback and aiding reflective practice

(Chivers & Darling, 1999), monitoring and reinforcing changes to development procedures (Siedentop, 1978), gaining insight into athlete perceptions and understanding (Morgan, et al., 2005), clarify athlete expectations and understanding (Leary, 1996), educate and disseminate knowledge regarding effective practice (Kitson, Harvey, & McCormack, 1998). Indeed, this tool can be used by researchers to assess the effect of interventions on the quality of TDEs and athlete perceptions. It can also be used to further investigate the nature of TD and continue the necessary and ongoing investigation of the validity of the TDEQ (Anastasi & Urbina, 1997).

While the TDEQ has been validated for use with adolescents, further validation is required, for example, investigating its discriminant ability within other sports, and potential similarities or differences in requirements at various stages of elite development and across genders. Of course, as always there are issues such as impression management associated with the use of questionnaires, particularly where 'evaluation' is involved (Buckley & Williams, 2002; Davies, 1985). As such, in order to gain reliable data it is important that the TDEQ be used with clear lines of anonymity, explanation of the importance of honesty and help with understanding where appropriate and perhaps may be most effective as a formative assessment tool to aid reflective practice, understanding and ongoing improvements. Importantly, there is a need to investigate the generic applicability of the TDEQ across wider environments though multi-sample confirmatory factor analysis (CFA) and provide more robust, causative evidence for its ecological and criterion validity through tracking studies.

CHAPTER 9 – CONCLUSIONS, GENERAL DISCUSSION AND RECOMMENDATIONS

9.1. Conclusions

9.1.1 Overview

This PhD has focussed on designing and implementing a programme of work that can provide cutting edge resources to those interested in applying evidence based practice with their TDEs. As such, the objectives of this thesis were fourfold:

1. To identify the 'needs' within current TD practice and provide clear direction and methodological guidance for the required programme of research.
2. To identify guidelines through a triangulation of evidence that enables the application of effective TD procedures.
3. To develop a tool to help bridge the theory-practice divide and enable practitioners and researchers to examine TDEs within applied settings.
4. To provide preliminary validation of the tool to assess the extent to which it has discriminant function.

9.1.2 Objective 1

Past research and literature available on the theory and practice of TID highlighted a clear need for progress. While there was great interest in understanding and delivering best practice, the philosophy of early identification and selection of 'talent' as opposed to effective TD appeared to dominate in both practice and TID research protocols, despite consistent findings highlighting the need for the contrary. Furthermore, many of the guidelines, even at a national strategic level (in the UK) lacked evidence, and offered few clear practical guidelines for coaches to apply in their development environments.

Leading onto the need for research to impact on coaching and its development, the literature within coaching expertise was examined. This highlighted key methodological issues and the need for:

a) Context and culturally specific focus,

b) Clear focus on the examination of both procedural and the declarative knowledge underpinning expert practice,

c) Focus within an 'excellence environment' based around Bloom's (1985) development stage,

d) Incorporation of the perceptions and experiences of current developing athletes and expert TD coaches within the UK, and finally

e) A more focussed examination of the aims and systems utilised by the 'developer' and 'development environment' as opposed to simply the experiences of the 'developee'.

Based on this rationale and methodological direction, this thesis described a scientifically validated programme of research that set out to investigate and examine the key aims and systems that drive effective TD and develop a method for aiding evidence based practice.

9.1.3 Objective 2

To accomplish objective 2, the thesis used a triangulation of evidence (including literature, coach and athlete consensus) to identify key features and methods associated with effective TDEs across a range of sports within the UK. This process involved specific interview protocol to maximise the emergence of key procedural and declarative knowledge relating to the goals, systems, and pathways that were effective. Secondly, systematic analysis techniques were used to ensure a

trustworthy and robust assessment of the data. This resulted in five features which consistently emerged from each of the facets of the triangulation: 1) Long Term Aims & Methods; 2) Wide Ranging, Coherent Messages & Support; 3) Emphasise Appropriate Development Not Early Success; 4) Individualised & Ongoing Development; and 5) Integrated, Holistic & Systematic (see figure 7.1 for more detail).

9.1.4 Objective 3

The data that emerged from chapters 3, 4, and 5 was used to develop a range of questionnaire items. A rigorous content and face validation process reduced these items to 68. Subsequently, an EFA reduced this further to a 54 item, 12 factor solution questionnaire (TDEQ). The structure matrix from the oblique EFA, also identified some potential relationships between several factors to leave the 12 factor TDEQ solution presented through six key features:

1. Individualised & Coherent Long Term Agenda

- *Integrated Long Term Agenda*
- *Understanding Progression to Senior Level*
- *Individually Focussed Development*
- *Clarity of Training Focus*
- *Personal Interest & Communication*
- *Individual Centred Support Network*

2. Commitment & Depth of Opportunities

- *Athlete & Parent Commitment*
- *Ongoing Development Opportunities*

3. Consistently Reinforced Standards

4. Challenging & Supportive Environment

5. Preparation For Future Challenges

6. Balanced Life & Sport Development

Figure 9.1 Structure of Key Features Emerged as Effective TDE Processes

9.1.5 Objective 4

Finally, objective 4 was accomplished through a DFA. This evaluation of the TDEQ's discriminant ability provided strong support for its ecological validity. The DFA found that the 12 factor solution could discriminate the quality of TDEs with 81% accuracy. While there is still some complexity regarding the nature of, and relative importance of the twelve factors, the results in chapter 8 provides important information to enable practitioners to use the TDEQ as part of evidence based evaluation. With all four thesis objectives fulfilled to a satisfactory level, the TDEQ can now be utilised to guide TD practice (evidence based) with confidence, as a theoretically, empirically supported and validated tool, within the delimitations of UK experiences.

9.1.6 Summary

In summary, there was a clear agenda to provide empirically justified, clear practical guidelines to drive TD practice, which provided both procedural and declarative information. This aimed to aid coaches to develop knowledge bases and understanding which could help inform decision making in the long and short term (cf. Abraham et al., 2006). Indeed, this focus on the processes of effective TD practice is important, because TD outcomes (i.e., development of potential to achieving elite) may take years to emerge and, in the meantime, it is difficult to assess, monitor or change processes with any great certainty of their efficacy. In response to this, the TDEQ and associated guidelines have been developed to aid the ability of TD coaches to implement evidence based practice more effectively. Consequently, given the apparent inadequate TD guidance in the UK, this series of

investigations, which identifies and tests the efficacy of key TD processes in a real world context is particularly useful.

9.2. General Discussion

9.2.1 Overview

There are several points which have emerged from the thesis as important for general discussion. First, the extent to which the TDE guidelines can provide generic guidance across sports. This is important because it has significant implications for the degree to which the TDEQ could impact broadly across sport development and coach education. As such, it is the first topic of discussion here, presented in sections 9.2.2 and 9.2.3. Second, due to the complexity of taking a holistic approach to TD practice, the nature of the TDEQ structure and the relative importance of the 12 factors become important. Whilst a conciseness and simplicity is needed to aid the implementation of evidence based practice, the complexity of what is required still needs to be recognised and explored further. This will be discussed in sections 9.2.4 and 9.2.5.

9.2.2 The Existence of Generic Guidelines for TDEs

One of the significant conclusions of Bloom's (1985) study of talented people was that generic features (e.g., important experiences, lines of progression) spanned across sports and other domains. This provided evidence to show the importance of understanding the extent to which generic features existed in TDE guidelines across sports. If there were shared features of effective practice across sports, then there would be important implications for more widespread dissemination of knowledge, coherence of work across sports, and evidence for the importance of cross-sport knowledge sharing.

This provided the PhD with a rationale to focus on the more generic features of effective practice (as opposed to sport specific). This involved several steps including utilising a variety of participants in the qualitative studies; unearthing and presenting underpinning declarative knowledge where possible to increase the likelihood of 'user generaliability' through chapters 3, 4 and 5 (Pehskin, 1993); using inductive and deductive analysis techniques to compare and contrast results systematically; use of representatives from multiple sports in the content and face validity procedures; and finally, use of multiple sports through the EFA and DFA work.

The first, and perhaps most obvious step towards establishing a more widely applicable set of guidelines was to use a wide variety of different sports and contexts, across genders, within chapters 3, 4 and 5. Secondly, the interview style in chapters 4 and 5 maintained a clear focus on what participants believed to be good TD practice and explored the declarative knowledge (whys) as well as the procedural knowledge (whats & hows) of the participants. Firstly, this ensured that user generalisability could be maximised by providing enough information and context to allow a critical view to be taken on what might be useful and why. This took the form of explanation, quotes and references to exemplify the emerging features of effective practice to attempt to provide context and understanding behind the guidance. Secondly, this focus on declarative as well as procedural knowledge, allowed the participants to focus on what was effective practice outside the confines of current practice and provide. Finally, an understanding of how, when and why procedures might be applied allows the reader to think effectively about how it applies through

different contexts and circumstances. A far more useful approach in the context of generic applicability, than simply providing prescriptive procedures.

The analysis procedures were also aimed to provide open assessment of the generic nature of the results. Inductive and deductive analysis was carried out in chapters 4 and 5 to provide evidence of theory generation from the data and an assessment of how well this information deductively aligned with the general guidelines that were emerging. This provided more context, grounded theory evaluation, and a systematic analysis of the extent to which there was general consensus across sports and individuals.

Furthermore, within the development of the TDEQ through chapters 7 and 8, a number of different experts from a variety of different sports were utilised to provide content and face validity to the features that had emerged. Indeed, the process involved a three hour workshop with cross sport discussion amongst experts recognised within their specific sports. The statistical procedures involving the EFA and DFA also used samples across at least two different sports (at least one individual and one team sport). This of course does not guarantee general application to other sports. However, within the context of other measures this could be seen as a useful step in attempting to establish generalisability of the results as best as possible.

9.2.3 Limitations Relating to Generic Features

This thesis took a number of precautions in attempting to establish genericity. However, caution needs to be taken due to the qualitative nature of the methodology utilised during chapters 3, 4 and 5. The sample characteristics and the interpretive nature of qualitative research mean that is always difficult to generalise beyond the

data used. For example, data are very specific to the sample and the particular circumstances or contexts in which they are situated. Also, a lack of experimental control means that data collected one day, may not be consistent if collected at a different time, and is dependant on a range of mediating variables. This is even the case when a high diversity of participants is used. However, in line with Guba (1978), it is still important to do what is possible to establish the generalisability of the findings, at least within the context of user generalisability, where the reader can decide for themselves how relevant the information is to their specific situation (Peshkin, 1993).

A further word of warning is required when considering the mixed sample used within the statistical tests. This approach was utilised in an attempt to show a level of genericity, but ironically, the variety of sports used in the sample may mask any sport specific differences that might exist. As such, in the future it is imperative that multi-sample CFAs be carried out to test the extent to which a robust factor structure exists across sports.

Finally, given that delimitations of this work include the data being based from UK participants; careful consideration would need to be taken as to its applicability in different cultures, particularly in those where the TD policies and procedures appear to be very different to the UK. Again, further work would be needed to assess the applicability of the TDEQ guidelines across cultures. This would perhaps need to involve more careful examination of the differences between the cultures through qualitative methods as well as examination of the applicable factor structure of the TDEQ and efficacy of the guidelines.

9.2.4 Complexity of the Guidelines – The Nature of the TDEQ

The nature of the 12 factor solution needs consideration. While it became clear that the nature of effective TD practice was complex as the thesis progressed, the EFA did identify a more simplified latent structure than emerged from chapters 3, 4 and 5. However, this may not be the full picture. When the details of the TDEQ are explored in depth, while it is apparent that no questionnaire factor should have less than three items (Bollen, 1989), 5 of the 12 TDEQ factors lie on this threshold. Given that some of the internal consistency results also point to potential problems with these factors, it is worth considering the complexity and appropriateness of the structure of the TDEQ.

In addition to some borderline internal consistency issues, the oblique EFA also highlighted relationships between a number of the factors which may point toward a more concise six factor model (see figure 9.1). Furthermore, the DFA revealed that, while the 12 factor solution predicted 81% of athletes' TDEs, using only three factors could predict 70.7%. Of course, given that all 10 TDEs were of a certain recognised quality, the sample is specific and reasonably small (116 participants in five TDE1s and five TDE2s), and that more effective TDEs may be in existence, due to the application of factors not highlighted as discriminatory in chapter 8, caution is needed.

Furthermore, the nature of TD has already been highlighted as a complex issue, and there may be a danger that, in the desire to simplify the guidance or TDEQ as much as possible, some important elements and subtleties are missed. Even so, given the limitations of some of the psychometric features of the TDEQ, it is worth considering the need to re-examine the factor structure using a more substantial

sample. Indeed, Costello & Osbourne, (2005) carried out an interesting piece of work identifying the associated 'risks' with low sample EFAs. They discovered that although recommendations revolve around a subject to item ratio of 5:1 (thesis EFA used a 5.22:1 ratio), there was only a 40% chance of getting a completely accurate factor structure. This rose to 60% with a ratio of 10:1 and 70% with a ratio of 20:1. As such, a re-examination of the TDEQ factor structure with an excess of 1360 subjects (≥20:1) may be a useful exercise given the circumstances.

9.2.5 Complexity of the Guidelines – Relative Importance of TDEQ Factors

Interestingly, while the 12 factor item structure emerged from the EFA, the DFA revealed that only three of the features were found to be statistically significant. The picture remains somewhat complex, given that six of the features did also show small effect sizes. However, it remains a question as to whether all of the features identified as factors within the TDEQ are important discriminators between good a less good practice. Furthermore, two of the factors "Balanced Life & Sport Development" and "Individual Centred Support Network" showed a negative trend. While it is important to point out that these 'trends' showed non significant differences and no evidence of even small effect sizes, it does warrant some discussion.

If, at best, there are no differences of these factors between differing qualities of practice, then questions need to be raised regarding the relevance of these factors in the TDEQ. However, the consideration of what these factors represent is crucial; for example, the idea that a balanced lifestyle and adoption of multi sport development is not irrelevant. Indeed, there is a lot of evidence to say that early specialisation is not effective for TD (e.g., Rushall, 1998) and that many benefits will

be gained from multi sport participation, even as an elite (e.g., Cote, 1999; Baker et al, 2003). However, multisport participation and educational interests may be of greater importance the younger an athlete is. Given the range of ages within the samples used in chapters 7 and 8, it may not be of surprise to see some potentially ambiguous results. Furthermore, those who do not attend University or college (or even those in well structured academies against less formal 'club' structures), may well skew the scoring system through missing values or random answers.

The other factor, "Individual Support Network" implies in short, that an effective TDE will have a variety of experts who are available to the athletes. Of course, while this may be true, the current nature of many TDEs in Britain (even very effective ones), may not have the access to this kind of resource. As such, it is clear that while this feature may be an important component of an effective TDE, it may not distinguish between TDEs in this sample because these types of support mechanisms are (as yet) still rare. In summary, it is crucial to consider these issues carefully before making any decisions as regards to the importance (or stage, or individual specific relevance) of the 12 factors, which have not shown statistical significance in chapter 8's DFA.

9.3 Future Development Recommendations

9.3.1. Overview

While the four thesis objectives have been systematically researched, there is still a clear need to build on this work and take it forward through further development and application of the TDEQ and guidelines. Specifically, there is a need to continue to evaluate the validity and understanding of the TDEQ across sports, levels of athlete development, and cultures. Secondly, there is a need to

further ratify the extent to which the TDEQ guidelines are causative of optimal TD outcomes. Finally, in line with the objective to aid the bridging of the theory-practice divide, more emphasis needs to be put on developing material which can help implement some of these key features on a practical level and accompany the TDEQ. This would not only help to provide a means to assess and monitor the quality of practice, gain feedback and examine the perceptions of developing athletes, but also to enable coach autonomy and ownership over change and development of their TDE.

9.3.2 Factor Structure & Genericity of Guidelines

As outlined above, given the apparent complexity of TD processes and the current psychometric properties of the TDEQ it is worth re-examining the TDEQ factors structure with a larger sample (≥1360) to maximise the likelihood of a fully accurate structure. Furthermore, while the evidence in this thesis points towards key generic feature of effective TDEs, the generic nature of the factor structure needs to be explored further across sports. This needs to take place through multi-sample CFAs. Having pointed out the need to explore the factor structure further, it is important to also recognise that the results of the DFA still provided strong evidence for the efficacy of the current TDEQ structure and associated guidelines. The TDEQ predicted with in excess of 80% accuracy the quality of athletes' TDE, based on their TDEQ responses. As such, the evidence to date warrants moving this practical application forward, even in light of the current limitations.

9.3.3 Efficacy of the TDEQ & Associated Guidelines

As with the investigation of the factor structure of the TDEQ, the efficacy of the TDEQ needs further work. The research within the thesis does not provide clear

causative evidence of the efficacy of the TDEQ. As such, work that utilises a longitudinal approach is imperative. This could plausibly look to monitor the outcome funnels of different TDEs overtime, with longitudinal measures of TDEQ, to confirm or otherwise the nature of the most successful environments. Furthermore, interventions based on the TDE guidelines could drive TDE practice, where outcome measures could be assessed against control groups. This final suggestion is currently being set up within an English Premiership football club as a post doctoral extension to the thesis.

9.3.4 Developing the Practical Applicability of the TDEQ & Guidelines

Whilst ongoing work is needed to refine and develop the TDEQ further, more information to help guide coaches to implement some of the recommendations would be invaluable. This could involve developing coach education materials, such as workshops, workbooks, and courses for the development of TDEs. Furthermore, the development of a 'TDEQ for coaches' would aid self reflection, planning and evaluation. Indeed, in addition to the refinement of the TDEQ and subsequent advice itself, long term research is required to test and utilise these guidelines and associated tools in practice. This would add value to the current work to date and enhance the likelihood of successful and widespread evidence based practice within TD.

9.4 Recommendations for Application

The recommendations so far have focussed on further developments that would be required, predominantly from an academic view point. This section aims to outline the current state of what has been produced in this PhD, and its potential for 'immediate' impact as it stands. The psychometric properties of the TDEQ already provide sound validity for its use in real world contexts. With clear description,

context and factor structure, evidence of use across a wide age range, ability to predict the quality of a TDE with 81% accuracy, evidence of generic application, it can be used right now, with confidence in a wide variety of contexts, within its delimitations (e.g., UK context, Bloom's development stage).

Given the current lack of evidence based and coach friendly recommendations across sports within UK policy (e.g., LTAD), the TDEQ and associated guidance has potential for significant impact on coach education and TDE development. This could help to take the 'mainstream' focus away from trying to 'unearth a diamond' (e.g., EIS, Sporting Giants, 2007) in time for the Olympics 2012, and start to focus on supporting NGBs, coaches and athletes more within their current TDEs. The TDEQ could provide a sound base from which collaborations, ongoing refinement and development of best practice could be evolved and disseminated helping Britain to convert more of our potential into successful senior international athletes.

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APPENDIX 1

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Talent Development: A Guide for Practice and Research Within Sport

Russell J.J. Martindale, Dave Collins, and Jim Daubney

The transformation of talented youngsters into senior world-beaters is a topic of interest for practitioners and researchers alike. Unfortunately there is a dearth of research to guide the optimization of this process. Accordingly, this paper offers an overview of key themes apparent in the literature that have relevance to the effective development of talent. The five key generic features that emerge consistently include long-term aims and methods; wide ranging coherent messages and support; emphasis on appropriate development rather than early selection; individualized and ongoing development; and finally, integrated, holistic, and systematic development. In addition to the review, exemplars of current worldwide practice are used to further highlight both the need and direction for further research and more broad education of an effective talent development model.

Interest in effectively identifying and developing sporting talent has grown in many countries over recent years (Abbott, Collins, Martindale, & Sowerby, 2002). For example, in 1994, Australia launched the Talent Search scheme to identify and develop talent within a working time frame for the Sydney Olympics 2000. However, it appears that many programs have focused primarily on the early identification of talent, often in order to select the best youngsters in the hope that they will be the most likely to become the best adults, while the more crucial process of nurturing and development has been, at least by comparison, somewhat neglected.

Of course, there are many influences that may have a crucial and lasting impact on the development and eventual success of a talented athlete (Gould, Dieffenbach, & Moffett, 2002). However, one major factor that influences all performers throughout their sporting careers is the quality and appropriateness of the coaching environment (Bloom, 1985). Unfortunately, the lack of research in this area leads us to believe that not enough is known about effective development environments or how they may be optimized.

It is recognized that people have different needs at different stages in their development and, as such, they often require different coaching environments as they progress (Van Rossum, 2001). Unfortunately, while elite level coaching is

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often assumed to be already effective (Lyle, 2000), most coaching research has focused on participation promotion (Abraham & Collins, 1998), and therefore there is little guidance for the coaches who are responsible for developing talented pre-elites through key transitions toward elite status (Falk, Lidor, Lander, & Lang, 2004; Van Rossum, 2001). Based on this lack of pertinent research, the need for consideration and then optimization of the process of developing youngsters into elite senior athletes seems clear. Indeed, with such an all-encompassing research aim, it is clear that the process is likely to require more than just a unidimensional evaluation of coach behaviors, as has happened in past research (Douge & Hastie, 1993). Thus, it seems appropriate to consider all aspects of the coaching situation, which for the purposes of this paper we have termed as the Talent Development Environment, henceforth referred to as TDE.

In addition to this clear research gap, it has long been stated that there is a need for context specific work (Douge & Hastie, 1993), and with recent shifts in coaching research methodology to examining and understanding the declarative knowledge of experts (Abraham & Collins, 1998), we believe that an understanding and synthesis of related research would provide a valuable base on which TDEs could be examined and future work be based. Finally, from a practical viewpoint, it has been highlighted that role guidance for many youth sport coaches is often implicit and therefore a theoretically driven model of effective practice on which critical reflection can take place would be highly beneficial (Gilbert & Trudel, 2004).

Based on these considerations, we have attempted to gain insight into a more holistic view of what an effective TDE is by drawing on a range of relevant work. We feel that the key themes presented represent a balanced and supported view of a broad and integrated picture of what we know to date, which can be used in order to critically reflect on what we do. In the final section we consider these guidelines against brief exemplars of systems and methods in current use in order to emphasize the importance of such a model to aid the enhancement of practice that, unfortunately, often runs contradictory to this information.

Part 1—Supporting Literature for Effective TDEs

Premise 1—Long Term Aims and Methods

Long Term Vision, Purpose, and Identity. Most, (if not all) national governing bodies and sports councils have visions of developing talent where the priority is to ensure that their athletes can develop to, and successfully perform at, the highest senior international level. This concept is reflected in Bloom's (1985) instrumental study in talent development, where ultimately successful development into the world's top 25 in their field was not necessarily accompanied by top performance at junior levels. In other words, the development of successful elite seniors may require a different development approach to the production of high level performing age groupers. Specifically in this regard, Bloom's work presented a staged model of progression where for individuals to move on successfully, they needed to have reached certain levels of skill, learning, attitude, or relationships but did not necessarily obtain overt levels of performance success at different age groups. Indeed, the following quote highlights the weak relationship that often exists between performance standards at different levels of development.

> Being good in one phase of the learning may not have a high relation to being good at a later phase, even though both phases are in the same talent field . . . without the purposeful step by step talent development process, it is unlikely that even the individuals we studied (top world 25) would have reached the high levels of talent development reported. (Bloom, 1985, p. 532-534)

The poor predictive validity of junior performance standards for later success, and therefore the need to move away from such a focus, is highlighted by statistics from Bloom's (1985) work where less than 10% of the now successful elite adults were thought to have been at a performance level by the age of 11 or 12 sufficient to indicate that they would have achieved what they eventually did. As a further implication, it is worth considering that if 90% of eventual world top 25 athletes do not necessarily shine supreme at young ages, what chance is there of identifying the future "journeyman pro" and distinguishing them from other enthusiastic young sportspeople solely through early performance standards? The necessity (or not) to perform at a high level at young ages is further highlighted by soccer in England, where only two players have represented internationally at every age group including senior level, Michael Owen and Terry Venables. These statistics question the appropriateness and the usefulness of focusing on and rewarding the explicit development of highly successful age-group sportspeople. Furthermore, Helsen, Starkes, and Van Wincel (1998) found that international hockey players, on average, did not reach their peak until their late twenties, highlighting that there is no rush to produce young star performers. In fact, it has been known for some time that early specialization and emphasis on all age groups winning is associated with early drop out and wasted talent (Gould, Feltz, Horn, & Weiss, 1982; Valeriote & Hansen, 1986). It is clear that the development of an explicit long term vision, purpose, and identity with associated processes is required.

Systematic Planning and Implementation. We know that a long term focus is required to become an expert (Bloom, 1985; Ericsson, Krampe, &Tesch-Romer, 1993; Starkes, Deakin, Allard, Hodges, & Hayes, 1996), but what seems less clear is the nature of this focus throughout development. As such, a long-term project requires effective coordination and once operationalized, these long-term goals must direct and integrate a wide variety of important factors to ensure processes are effective in helping our youngsters achieve their long-term potential. Such a clear system would provide a philosophy that coherently drives the aims and practices of talent identification and development, the coaching process, funding, resources, evaluation, coach reward, competition, and club structure. This complex process and the number of people and factors involved in coherent practice require systematic planning and implementation in a number of areas. Indeed, development within complex environments benefit greatly from systematic "deliberate experiences" (Ollis, MacPherson, & Collins, in press).

Systematic consideration of long term requirements is crucial. For example, Cote and Hay (2002) have suggested that engagement in playful and varied non-domain specific activities are valuable at early stages of development, and late specialization (13–17) appears to be an important predictor of the quality of later skill development. Furthermore, we must recognize that long term development of expertise incorporates many more issues than just the ability to learn to perform successfully. For example, issues of motivation and long term adherence (Deci

& Ryan, 1985), perceived competence (Sternberg, 2000), the importance of fundamental cognitive and motor skills (Beamer, Cote, & Ericsson, 1999; Ericsson, 1998) and access to the necessary opportunities (Bloom, 1985) are all crucial. In conclusion, it is clear that long term visions must systematically and explicitly drive the systems that influence athletes, coaches, parents, and society. For a variety of reasons, it appears easy to ignore evidence from the research at both an individual and system level. For example, while early specialization is common practice, and may develop youngsters quickly into successful age group performers, it is far less effective for long term development.

Reinforcement at a Number of Levels. It would appear from literature that such a systematically implemented long-term vision needs to be reinforced at a number of levels; indeed this may be a major problem in delivering wide spread coherent practice.

The development of appropriate attitudes and behaviors is important (Smircich, 1983) and one important aspect of this process involves the establishment of an appropriate ethos or culture in order to build a self-reinforcing coherent environment. Research shows that this can be achieved through the development of common identity and commitment that guides individual and group goals, reflects appropriate conduct and performance standards, and is reinforced through consistent reward systems (Ashforth & Mael, 1996). Such development also promotes a social system stability that encourages a positive and reinforcing environment and helps promote understanding and motivation by explicitly making sense of an organization's function, long-term goals, and links between the two. Of course, implicit influences also play a large part in shaping our expectations and practice (Schein, 1983). These work at a number of levels and, as such, it is imperative that we look at how systems we implement impact across the whole talent development process, how and what they are subsequently reinforcing and promoting.

For example, consider the explicit and implicit "reinforcement" and "guidance" that systems give that make it a necessity (and therefore a focus and pressure for all involved) for young developing athletes to reach certain performance standards in order to gain select opportunities or funding. As we have mentioned, consequences of such a system include a high likelihood that many youngsters with future potential will be missed due to the insistence of providing specialist selective training and opportunities at early ages only to those who perform well. Evidence suggests it could be almost impossible to "catch up" once deselected, resulting in early deselection meaning permanent deselection, with a subsequent reduction in talent base and quality at the top. A potential confound relates to the physical maturity benefits to "performance" at young ages in certain sports and as such will (when there is a focus on performance!) bias selection policy and opportunity toward certain youngsters, namely those older in their year group (Baxter-Jones & Helms, 1996; Richardson & Stratton, 1999). This initial selection may result in a subsequent self-fulfilling process of selection, training, improvement, and selection of those initially involved. Indeed, Ward and Williams (2003) concluded that the higher skill levels of "elite" soccer players as young as 8 are likely to be as a result of the 200 hours of expert coaching they have received as opposed to any genetic superiority! Furthermore, Abbott et al. (2002) highlight that while this "school of hard knocks" may produce results through selecting and progressing only those who can consistently produce the goods, it does appear to significantly influence the proportion of older players who are selected at senior level (Barnsley, Thompson, & Legault, 1992), and furthermore many of those born late in the selection year tend to drop out early (Helsen, Starkes, & Van Wincle, 1998). Self imposed selection systems are potentially important sources of perceived competence for young people, as well as developmental opportunities, a factor known to be extremely important for progression (Deci & Ryan, 1985).

Ironically, while the evidence suggests that early selection based only on performance leads to many with potential not getting the necessary opportunities, those who *are* selected early may also be at a disadvantage. While they will improve initially, early achievers may be prone to premature drop out through competitive pressure (Gould et al., 1982; Moore, Collins, & Burwitz, 1998). Furthermore, those selected may miss crucial (long term) development experiences (e.g., Cote & Hay, 2002) by focusing too much on performance as opposed to learning (Ericsson, 1998). Thus, while many may "win" at junior levels, they may end up ill prepared to make the important step to senior level and fail to make the transition (Moore et al., 1998; Stafford, 2005).

When we consider the contradiction between advice emanating from the literature and the many systems currently in place, it is clear that much more needs to be done to operationalize our long term aims explicitly. Systems of selection and funding opportunities based on early performance criteria seriously undermine the goals and expectations of long term development plans through the system. For example, many coaches' (plus athletes' and parents') expectations and understanding are shaped by perceived or real rewards for producing "winning" age group teams, whereby selection policies will be influenced by the extent to which youngsters can help a team win at that time, as opposed to providing those with long term potential a good developmental experience. Of course, the selection criteria for funding also have similar concerns. Representative selection policies, development programs, and funding policies can be to the detriment of individual long-term development, working systematically against the long term national governing body visions developed in the first place. In conclusion, these all too common situations highlight the need to prioritize long-term aims and methods more explicitly through a multitude of contexts throughout the whole lifespan of sporting development.

Premise 2—Wide Ranging Coherent Support and Messages

Provide Coherent Philosophies, Aims, and Methods at a Variety of Levels. The previous section presented evidence for the importance of long-term procedures in effective TDEs; obviously there are a large number of factors influencing youngsters as they develop within their sporting careers and lives, including the aims and practices of talent identification and development, the coaching process, funding, resources, evaluation, and coach reward, competition, and club structure. In fact, recent research into the development of Olympic champions (Gould et al., 2002) has shown the wide range of long-term individual and institutional influences that may significantly influence development, can reach far beyond the sporting context. Csikszentmihalyi, Whalen, Wong, and Rathunde (1993) concluded that

development will not occur unless the talent is valued by society and recognized and nurtured by parents, teachers, and coaches.

With a large number of key influences in our lives, it is extremely important to understand how powerful the effects of *coherent* messages from these various influences can be. Evidence from behavior management clearly shows the positive effects on people's behavior when clear objectives are presented in conjunction with equally clear and unambiguous reward and reinforcement contingencies (Siedentop, 1978), particularly where care is taken to understand the impact that our perceptions and intentions play on motivation (Lepper & Greene, 1975). Even at elite level, key factors associated with training commitment such as self-motivation, reinforcement skills, perceived control, outcome expectancies, and group norms can be directly influenced by external sources (Palmer, Burwitz, Smith, & Collins, 1999).

At a slightly different level, the importance of developing coherent systems at different levels is exemplified by research, which shows that even with long-term objectives, if rewards and assessment are not compatible with the long-term aims of learning, people will pursue what they perceive to be important (Entwistle & Kozeki, 1985). Especially with younger, less informed and focused individuals, these are often the choices that offer immediate gratification, which could well be counter productive to long-term development. Other factors influencing the patterns of learning adopted include emotions, school ethos, and parental involvement (Entwistle, 1987). Again, the message is clear; it is crucial for development policies to encourage coherent philosophies, aims, and methods within (and outwith) TDEs, highlighting the need to carefully consider a wide range of factors. Indeed, in a similar fashion, coaches must be encouraged to develop athletes for long-term success through a coherent system at a number of levels, where reinforcement is both clear and consistent. For example, it would be counter productive to provide funding and recognition to those that produce winning age group teams without referral to long-term development achievements. If real change is to occur, careful consideration of the influences of our coaches and TDEs are paramount.

Educate Parents, Schools, Peers, Coaches, and Important Others (and encourage positive contributions!). Coaches are influential, especially once a step has been taken to become more serious about a sport (Bloom, 1985; Gould et al., 2002); however, they are not the only people to influence young talent, and the importance of the family (Bloom, 1985; Brustad, 1993) and school life is clear (Csikszentmihalyi et al., 1993; Durand-Bush & Salmela, 2002). The combination of nonpressured preparation, challenge, and support helps foster certain skills and attitudes that pay dividends in the long-term (Cote, 1999; Csikszentmihalyi et al., 1993; Gould et al., 2002), and the necessary practical and financial support and development of a variety of support networks is often parent led (Bloom, 1985). Indeed, Gould et al. (2002) show that key individuals in the athletes' socialization network need to be systematically educated and involved appropriately to foster desirable characteristics.

Utilize Role Models at a Number of Levels. Research highlights the effects of observing role model on people's behavior and attitudes such as moral reasoning (e.g., Bandura & McDonald, 1963). It is clear that any influential people, for example parents, can have a large impact on a child's beliefs and attitudes (Bloom, 1985; Brustad, 1993). If appropriate, these positively influenced attitudes can pay dividends for the long-term development of talent (Cote, 1999; Csikszentmihalyi et al., 1993; Gould et al., 2002). Of course, different people at different times can be more, or at least equally as, influential as others. This includes a wide range of individuals from coaches, teachers, schools, peers, and achieving or already successful adults (Cote, 1999; Csikszentmihalyi et al., 1993; Durand-Bush & Salmela, 2002; Gould et al., 2002). Hence the utilization of a variety of role models at different levels is required to maximize the impact on the development and choices of any youngster.

Open Communication Patterns. Educational sessions are an obvious method of informing those important influences, but involving parents more directly could also be key. Evidence suggests that the more interest and encouragement given by parents, the more likely youngsters will stay involved, even at elite level (Weiss & Hyashi, 1995). In fact, such support may be crucial; for example, it was found that in England around 40% of elite athletes aged 25 and under were still financially dependant on parents (Moore et al., 1998). The reciprocal socialization effects of sport involvement (Weiss & Hyashi, 1995) may also be useful for fostering extremely effective support networks, particularly if parents are given appropriate opportunities to be involved. Furthermore, it would seem that there must be ample opportunity for effective communication patterns, not only between parents and coaches, but also university, work, and other involved and important parties. Indeed, this is where any problems or conflicts can be solved in the interest of the athlete and not those with most power. Organizational psychology highlights that effective organizations explicitly promote clear expectations and open communication systems to allow provision for any conflicts that may arise (Bemowski, 1996).

Set up a Variety of Support Networks. Within the UK, research highlights the context specific nature of talent development, where stages are less clear and transitions are more crucial (Moore et al., 1998). Certainly the idea that transition periods are critical to future success is widely recognized (Durand-Bush & Salmela, 2002; Sinclair & Orlick, 1993). The variety of support available and the range of mental skills utilized by an individual determine how beneficial a transition may be, and this could be the key to successful development (Abbott et al., 2002; Sinclair & Orlick, 1993). A range of other UK research highlights the need to investigate and acknowledge the nature of sport-specific problem periods and set up a variety of support networks over the long-term if more of our talented athletes are to be successful (Moore et al., 1998; Rowley, 1992). It appears that a wide variety of formal and informal, sport and individual specific support networks are crucial to the progression of many younger athletes. For example, it has been highlighted that while provision for elite athletes in the UK appears to be good, it is almost nonexistent for developing athletes (Moore et al., 1998).

Premise 3—Emphasize Appropriate Development NOT Early Selection

Performance Is Different From Potential: The Need to Move Away From a Focus on Early Selection. The characteristics of successful elite and developing athletes highlight the need to take a long-term view to talent identification and development. For example, the characteristics of effective performance are very different from those factors associated with the potential to develop and become successful

(Abbott & Collins, 2002; Abbott et al., 2002; Bloom, 1985). Therefore, what we try to identify and what we try to promote through development-focused coaching needs to be based within a concept of talent that is defined as potential and not as current performance ability. Unfortunately, the majority of talent identification and development programs throughout the world still appear to use performance measures as a main indicator of talent at all levels, an approach already shown to be highly problematic and a major barrier to development (Abbott & Collins, 2002; Abbott et al., 2002). To highlight this notion further, even extremely talented adults rarely start out as highly able children (Bloom, 1985), and "those who eventually become expert performers do not start out in a domain of expertise with an already exceptional level of performance as compared with their peers, when the benefits from earlier engagement in other related activities are considered" (Ericsson, 2003, p. 65–66). Leading on from this, while it is generally accepted that both genetics and the environment play a part in expertise development, there is a considerable amount of research that highlights how expertise and skills associated with high level performance are improved and developed through training (Ericson & Lehmann, 1996; Helson et al., 1998; Starkes, 2000). For example, Ward and Williams (2003) concluded that "elite" footballers as young as eight had better skills due to extra opportunities rather than any genetic advantage. Such serendipitous early training can mask those with true potential, especially if large discrepancies exist between children's opportunities at early ages.

Furthermore, due to the large amounts of change and progression made over a career, high ability is often not apparent until later, again masking our ability to identify talent at development stages (Bloom, 1985; Simonton, 1999). Indeed, certain skills and knowledge important for later performance success, although they can be trained and improved at early ages, do not become fully developed or explicitly apparent until later (Abertheny & Russell, 1987; Tenebaum, Sar-El, & Bar-Eli, 2000). For example, important memory skills can take up to 10 years to develop fully, but rarely show themselves before 16 (French & Mcpherson, 1999). As such, training that benefits long term preparation (e.g., fundamental development, nondomain specific deliberate play) would potentially not be as effective at producing short-term performance gains as intense sport specific practice (Cote & Hay, 2002), and as such we must assess our focus carefully.

Further support suggests that the determinants of performance do not continually characterize success through the age groups (Abbott & Easson, 2002; Regnier & Salmela, 1987). Skills that may be identified or promoted in development environments in order to achieve short-term success may become redundant a year later. For example, hard running and physical maturity may be key to rugby success at the age of 12, but as athletes get older and size and strength factors balance out, mental factors such as decision making and anticipation become more important for success (Abbott & Easson, 2002). Of course, certain skills are important for performance at many different levels (8–18), such as certain perceptual and cognitive skills (Ward & Williams, 2003), so it would be appropriate to identify what is key and develop these in as many youngsters as possible.

It seems clear that in order to provide youngsters with the best chance of realizing their potential in the longer term, talent identification and development programs must focus on habits and skills that will be effective at later stages, together with

those which enhance a youngster's ability to learn, develop, and progress successfully into the future. Ideally, such programs will deemphasize identification and selection and stress appropriate development, while avoiding common mistakes such as the overemphasis on factors solely associated with age specific success. Of course, we acknowledge that while age group success must not drive the aims of practice, it may still happen. After all, someone has to win! However, the key message is that *performance* needs to be clearly separated from *potential* in both the requirements of identification and development priorities, and it is imperative that expectations, roles, and understanding within each level of development are clear and unambiguous in order to provide the required coherent promotion of long-term development throughout a sporting system.

What Are the Characteristics of Appropriate Development?

Provision of Stage-Specific Integrated Experiences and Teaching. It is convenient to use stage approaches to talent development, not least because on a practical level, we have progressive and often age related stages in our school system and sport pathways. In addition, research has produced a complementary stage model (Bloom, 1985; Durand-Bush & Salmela, 2002; Ericsson et al., 1993; Van Rossum, 2001), and market gaps have spawned more practical models (Stafford, 2005), all of which may help guide effective and practical solutions. The extent to which advice is explicitly and coherently promoted from such models is not clear; however, while it is important to have a good understanding and definition of what is required at different developmental stages, research highlights the individual, dynamic, and unpredictable development process (Abbott, Button, Pepping, & Collins, 2005; Bloom 1985; Ollis et al., in press). Therefore, systems must allow for the possible absence of set stages through which any one individual may progress (Moore et al., 1998). General templates may help organize our programs and help us understand the priority at any particular moment in time or stage of development for a particular individual, but prescriptive packages and plans must be avoided.

Hence, the information to follow attempts to provide understanding and awareness of important factors from which coaches, teachers, (and more importantly) specific sports, activity, or school systems must consider before developing their programs and pinpointing what must take priority at each level and why.

Fundamental Mental Skills

Emotional Attachment. Mental skills are not confined to practical skills such as concentration or goal setting; this term also includes attitudes, emotions, motivations, and desires. This underlying collection of mental skills is crucial for both participation and the pursuit of excellence in sport (indeed in almost any endeavor). It is well documented that without developing a strong emotional attachment and intrinsic pleasure from taking part in a certain activity, one will not pursue it to a high level (Bloom, 1985). This is perhaps one reason why those who make it to the top tend to engage in more deliberate play and sport diversity between the ages of 7 and 12 than do nonexperts (Cote, 1999; Cote & Hay, 2002). It would make

sense that this be prioritized at early development stages, perhaps through fun and nonpressured environments. Parents, teachers, and coaches, among others, may have a strong influence here.

Learning, Development, Performance, and Life Skills. In addition to developing (often at early stages) a strong desire and positive attachment to pursue sport or activity at any level (e.g., health activity, sport club, elite level), mental skills that enable an athlete to acquire and consolidate skills, in other words learn and develop, are essential (Abbott et al., 2002; Sternberg, 2000). Additionally, the young athlete must be motivated to put in the many hours of deliberate practice required to excel in any field (Bloom, 1985; Ericsson et al., 1993) and to be able to keep progressing when times are hard (Bloom, 1985; Sinclair & Orlick, 1993). Interestingly, many studies have shown that it is only psychological factors that can distinguish performance levels (Talbot-Honeck & Orlick, 1998), and staying power at an elite level (Kreiner-Phillips & Orlick, 1993). This broad literature highlights the importance of psychological factors as causative drivers of success and supports the need to systematically incorporate such skills into all TDEs from early ages.

The broad scope of these skills relate to performance, lifestyle management, learning, and development. Although a definitive set of mental skills has yet to be agreed upon, research from a number of fields of study consistently produces similar factors (Bloom, 1985; Gould et al., 2002; Orlick & Partington, 1988). Crucially, research also suggests that these mental skills and attitudes can be systematically developed and are not just innate qualities, whereby certain key behaviors or traits are underpinned by teachable skills. For example, learning autonomy is an important aspect of successful development and is underpinned by strategies such as adopting a meta-cognitive overview, planning, monitoring, self evaluation, and a mixture of attitudes, such as curiosity, persistence, and confidence (Freeman, 1995). Indeed, it is all of these mental skills that would help characterize someone with potential and therefore help with the holistic process of identification and focus for development.

Fundamental Physical Skills

Particularly within a sport specific environment, a broad range of fundamental movement and decision-making skills also characterize children with potential, because they underpin the development of the more sport specific skills required for future successful performance and involvement in more specialized activities (Beamer et al., 1999; Jess, Collins, & Burwitz, 1998). Again, these basics are not innate qualities and they need to be developed systematically (Gallahue, 1982); however, unless a child has developed the generic fundamental skills by the age of 11 or 12, future sport specific success may be beyond reach (Moore et al., 1998). Furthermore, it has been shown that up to 45% of preelite athletes reach an elite level in a different sport so that even in the case of elite sport, it would be sensible to develop a broad range of skills first. In line with this argument, several studies show that early specialization does not favor the development of elite athletes, and before adolescence, diverse sports participation is more important (Cote & Hay, 2002; Hill, 1993), perhaps acting as a foundation of mental and physical skills (Beamer et al., 1999; Ericsson, 1998). Again this highlights the apparent advantage, and perhaps necessity, to develop a sound grounding in fundamental skills (cognitive and physical) in order to become successful in a specific domain, or for a physically active lifestyle (Abbott et al., 2002).

Sport Specific Skills—the Importance of Integration

What Habits and Skills Will Be Effective at Later Stages? The factors that are important at later stages are a sport specific concern. Studying the senior game and predicting any likely trends is very important in understanding what may be most usefully developed now. However, while it may be easy to identify effective habits, it may take time to teach them well, especially where poor habits, such as over-dribbling in hockey or raw power in rugby, are often rewarded with success at younger ages. This tactic will quickly lose its effectiveness at higher levels, however, when skills such as decision making under pressure and fast accurate passing become key. Unfortunately, many young players may give up at this stage, demotivated by the sudden drop in performance standard previously achieved by a well conditioned but now limiting skill (Blanksby, 1980).

Research highlights that it would be sensible to incorporate a wide variety of cognitive, perceptual, and motor skills into training programs (Janelle & Hillman, 2003), as many "teachable" factors are important in distinguishing the best performers at later stages (Helsen & Starkes, 1999; Simonton, 1999; Ward & Williams, 2003; Williams & Reilly, 2000; for a fuller review of this objective evidence of factors associated with the development of performance, see Starkes & Ericsson, 2003; Williams & Hodges, 2004). For example, only an integration of anthropometric, physical, psychological, and sport specific factors could distinguish senior footballers at elite and subelite levels (Reilly, Williams, Nevill, & Franks, 2000). As the hockey example highlighted, it is often only the integration of skills, such as decision making and passing, that are effective at later stages. Therefore it is extremely important that habits and skills are formed in an interdisciplinary and integrated manner in order for them to be truly useful and transferable; furthermore, the importance of interdisciplinary work is well documented within sport science research (Burwitz, Moore, & Wilkinson, 1994).

Balance

The concept of balance runs at a number of levels where a balanced skills base specifically relating to the depth and breadth of physical and mental skills, but also in terms of a broad range of factors such as nutrition, flexibility, strength, fundamental skills, mental skills, decision-making skills, and so on need to be developed. At a different level, the ability to organize and balance one's lifestyle is also extremely important. Research indicates that stress is an accumulative process and comes from a variety of physical and psychological factors (Silva, 1990). As such, being able to balance one's life stresses is extremely important in staying injury free, motivated, and developing and performing well (Salmela & Moraes, 2003). Finally, one must consider the stress that retirement can cause to athletes, especially if it is enforced through injury (Sinclair & Orlick, 1993). Indeed, such a transition has been shown to be smoother and more beneficial to future development and

well-being if there are clear goals and skills that can be utilized after an athletic career is over. Therefore, as part of a healthy training and performance career, education and future planning must play an ongoing role. Indeed it can also be used as part of recovery and relaxation away from the sport.

Encourage Responsibility and Autonomy in Learning and Development and Promote Personal Relevance and Athlete Understanding. Within the development stage of progression (Bloom, 1985), effective environments have been shown to require an ethos of respect, discipline, independence, and sacrifice. In these environments, teaching and learning become based around the systematic acquisition of skills through many hours of practice, where high levels of intrinsic motivation and commitment are required. Crucially, an increasing responsibility and autonomy from the learner is demanded (Bloom, 1985; Csikszentmihalyi et al., 1993).

The necessity of taking responsibility for long term development is emphasized further in a broad range of relevant literature, including motor and cognitive learning and teacher and student approaches, where vast differences between long and short-term development is explicit (Entwistle, 1987; Schmidt & Wrisberg, 2000). From the learner's point of view, long-term progression requires the development of a large, domain specific knowledge base through many hours of training (Scheider, 1993), developing autonomy and taking responsibility for learning (Knowles, Holton, & Swanson, 1998), elaborating and making development personally relevant, organizing new learning onto previous knowledge, everyday experiences, long-term objectives, and utilizing a variety of mental skills (Entwistle, 1987).

Develop Intrinsic Motivation and Personal Commitment to the Process. Motivation is absolutely paramount to successful development in any form of pursuit; without it there is no drive to learn, develop, or succeed. Indeed, "most amateurs do not improve their performance only because they have reached (in their minds) an acceptable level" (Ericsson, 2003, p. 63). Although there appear to be different motivational requirements at various stages of development (Bloom, 1985; Van Rossum, 2001), key driving forces such as intrinsic motivation and self-determination are crucial at all levels. At the early stages, these factors occur in a variety of forms (e.g., the need to feel worthy and competent), and although most children withdraw from sport because of other interests, a significant minority leave due to their needs not being met, such as lack of fun, too much pressure, or a dislike of the coach (Gould et al., 1982). However, at more serious preelite and elite levels, such as at stages two and three of Bloom's model, intrinsic motivation and self-determination emerge in different forms to meet the requirements of the achievement setting (Bloom, 1985). While it is recognized that these forms of motivation and choice come from within, the coach environment can have a major impact on youngsters and therefore must promote these factors by setting the right motivational climate. For example, providing opportunities for athletes to gain ownership of their development is shown to be effective in developing intrinsic motivation, and further research areas including goal perspectives, goal setting theory, attributions and performance evaluation (cf. Hardy, Jones, & Gould, 2000) suggest that different combinations of strategies are essential, the exact mix of which is both individual and context specific and can potentially change over time as an athlete develops and situations vary. Such research adds to the growing number of areas that highlight the need to provide individual and ongoing support that incorporates a strong sense of mental skill training in any TDE. Indeed, it must be recognized that mental skills, as with many aspects of talent development, need to be integrated coherently with one another to be effective; for example, Hardy et al. (2000) state that the "relationships that exist between such variables as perceived competence, goal orientation, outcome rewards, attributions, emotional reactions, self-efficacy and subsequent motivation" are extremely important (p. 93). While the integration and teaching of mental skills is important, it is also necessary to highlight that these skills and attitudes can be influenced to a large extent informally through the environment itself and perhaps currently, due to the lack of systematic sport psychology training, this is the most potent form of athlete learning.

Premise 4—Individualized and Ongoing Development

Provide Opportunities and Fundamentals to as Many Youngsters as Possible. Through the empirical and theoretical literature presented earlier, it has been argued that we need to move away from early selection policies and an emphasis on winning at young ages, in part because it is so difficult to predict the ultimate level that someone can reach. Through the same evidence base, with the addition of the evidence presented on the importance of fundamental physical and mental skills, it becomes obvious that these skills need to be systematically developed in as many children as possible from an early age. Such opportunities for all, providing a foundation of quality physical and mental education, could be initiated successfully through the school system, supplemented by coherent sport and health initiatives. In turn, this could provide the coherence and consistency required to develop a physically active and talent rich culture, as can be seen in a recent Scottish initiative, the Developing the Potential of Young People Through Sport (DPYPS) program (Randak, 2003).

Provide Flexible Systems to Allow for Performance and Physical Development Variation. Similarly, earlier sections highlight the likelihood of performance and physical development variations throughout development. Indeed, empirical evidence shows the unstable nature of anthropometric such as height (Abbott & Collins, 2002) and general growth patterns (Ackland & Bloomfield, 1996), especially through adolescence. The implication is clear: "the identification of some positive characteristic in a pre-adolescent child . . . does not guarantee that the characteristic will remain throughout the process of maturation toward the adult form" (Ackland and Bloomfield, 1996, p. 57). Similarly, performance factors are also unstable due to factors such as maturation and training effects (Abbott & Collins, 2002; Ward & Williams, 2003).

Furthermore, Simonton's (1999) model of talent development highlighted talent as multidimensional, whereby a number of factors can contribute to the existence of talent within any domain. Talent and its development is dynamic and over time "infancy, adolescence and even adulthood will see the latent components undergoing various transformations" (Simonton, 1999, p. 442). In other words, talent will develop and change over time in both adaptive and maladaptive ways, depending on certain innate and environmental factors. The implications of such a dynamic

process are that systems must be flexible enough to allow for such variations. For example, good club structure can provide a wide range of opportunities at a variety of junior and senior age groups, within which one can cater for differing standards. This would allow movement in and out of the system without a full loss of resources and opportunities. Coherent coach education and philosophy could minimize this still further. If representative teams were deemphasized until later ages, this would further leave the door of opportunity open for more for longer and allow a system of talent identification to take place over time through the club game.

Identify, Prepare for, and Support Individuals Through Key Transitions. It is apparent that development is extremely individualized and in turn, for effective practice, individuals have to be treated as such. It has already been presented that transitions, or periods of change, are key for future development, and during "sensitive" periods, young athletes may be more vulnerable to dropping out of sport or retiring early (Rowley, 1992). In fact, the variety of support available and the range of mental skills utilized by an individual is likely to determine how beneficial a transition may be; indeed different or additional attributes and skills may be required. This development could be the key to successful progression (Abbott et al., 2002; Sinclair & Orlick, 1993). However, this need for mental skills is worrying when you consider the large number of problem periods (Rowley, 1992), coupled with a lack of (albeit growing) interest in sport psychology within the UK (Moore et al., 1998). UK research highlights the need to identify and understand the nature of sport and individually specific problems and set up a variety of support networks, education, and training over the long term if more of our athletes are to be successful (Moore et al., 1998; Rowley, 1992), and while many issues may be generic and dealt with on a broad scale, other individualized circumstances need to be tackled on that basis.

Provide Regular Individual Goal Setting and Review Processes and Systematic Reinforcement Contingencies. Due to the dynamic and individualized nature of development, it is imperative that youngsters are treated as individuals, and their needs are individually met as often as possible. The effectiveness of such teaching and educational approaches are well documented (Ysseldyke & Christenson, 1987). Coaching environments perhaps offer even more opportunity for individualization, particularly in a professional setup. Recent work has shown the importance of individual attention to the eventual development of high-level talent (Bloom, 1985; Csikszentmihalyi et al., 1993; Gould et al., 2002). Regular goal setting and review systems, in conjunction with informal and formal opportunities to communicate, are one method of ensuring individual contact. Furthermore, the individualized nature of many behavior change interventions supports the importance of individualized practice, especially when combined with contingent reinforcement strategies (Siedentop, 1978).

Part 2—Summary and Guide For Effective TDEs

While we recognize that this review has a broad and diverse scope, the strength of the model that follows lies in the consistency with which several key features reappear throughout the variety of literature presented. Accordingly, these key ideas have been amalgamated and integrated to provide a theoretically-based and empirically-supported model of effective practice. A range of methods has been presented to provide a practical element to the model. Importantly, while certain methods have been associated with specific key messages, the model is integrated and dynamic; all methods and key elements interact with one another and therefore the need for systematic development is clear. This model, presented in Figure 1, offers an applied synthesis of the varied literature reviewed this far.

The importance of this model is highlighted through evidence inherent in current work in this area (Falk et al., 2004) and through the exemplars of current practice to follow. First and positively (in our view), Falk et al. (2004) explicitly request and support the need for a model of talent identification and development by highlighting that at present, there is a lack of clear-cut guidance for the development and operation of talent identification and development schemes. They also acknowledge some of the flaws in trying to identify and select those youngsters with potential from performance criteria, for instance, the masking effects of different maturity levels and previous practice. Importantly, they also make pertinent suggestions regarding talent development, such as the need to teach skills within an integrated decision-making context.

Unfortunately, however, and in contradiction to the advice that emerges from both their stated position and our review, Falk et al. go on to conduct a TI methodology based on early performance (at age 14) as an indicator of eventual achievement. The point is, yet again, that a coherent approach to talent identification and development is hard to find. Inconsistency is apparent both between and even within approaches, and this recently published and peer-reviewed paper shows that agreement with the guidelines offered in this paper is far from universal.

Reflecting this position, we hope this review can provide the foundation on which research can move away from attempting to identify performance correlates of potential and focus more explicitly on the need to explore the individual and environmental factors that are causative of effective development and future success, for example, the characteristics of excellence (Abbott & Collins, 2002; Bloom, 1985; Gould et al., 2002; Orlick & Partington, 1988) and the coaching environment (Bloom, 1985; Gould et al., 2002). Bloom's (1985) influential work in this field supports this contention: "rather than continuing to search for the definition and identification of the talented, it would be more productive to look at the dynamic interaction between individuals and their opportunities, to take a long term developmental approach to talented especially creative behaviour" (p. 533).

Part 3—A Comparison of Current Practice With the Key Messages From the Literature

Further support for the need to provide such explicit guidelines is presented in this section through the consideration of current practice around the world, much of which contradicts the suggestions of this review. Many millions of pounds have supported the development of the world class performance programs in the UK. For example, the English World Class Potential and Start programs collectively support 23 sports, with a specific focus on the development of talent. Unfortunately, even with such an investment, explicit guidelines regarding how talent is identified

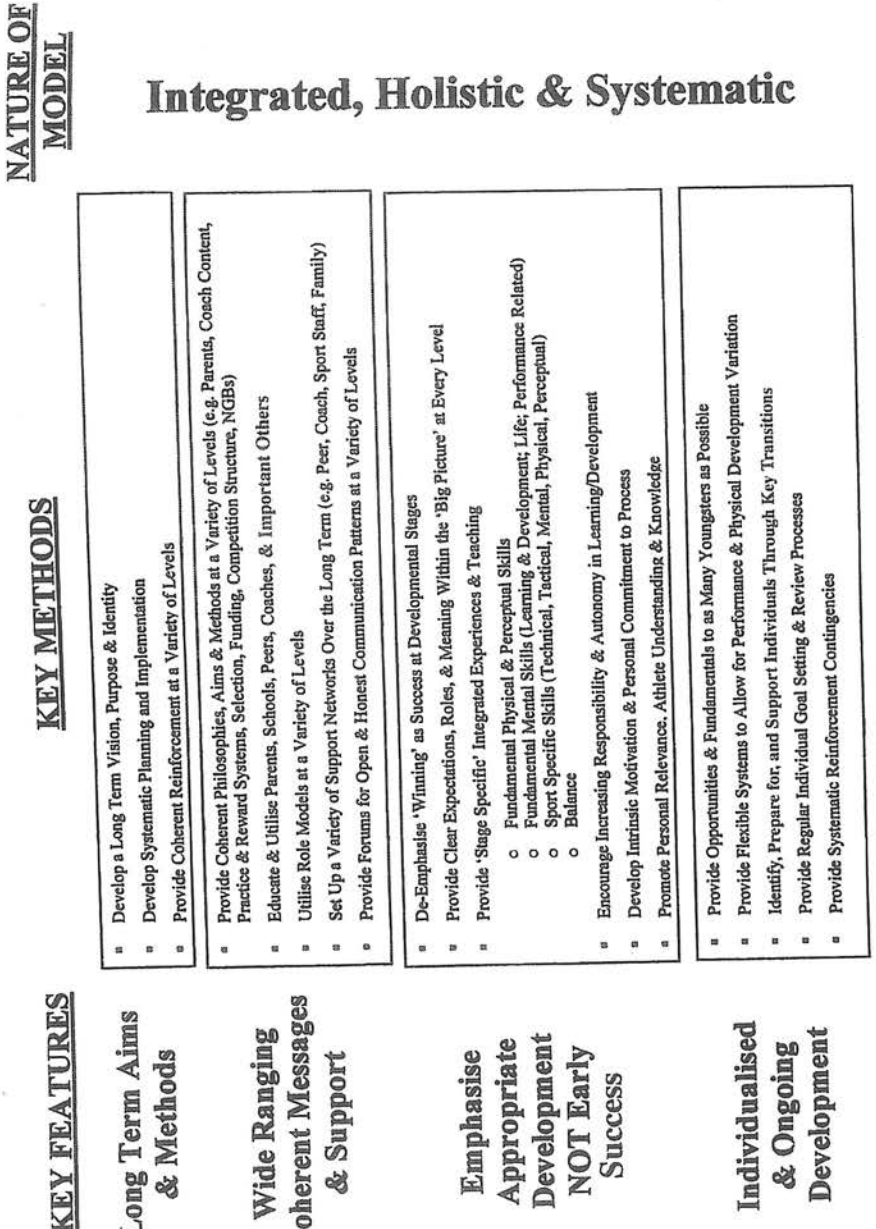

Figure 1 — The model of effective talent identification and development procedures emerging from the literature.

and developed are difficult to find. Guidelines that are apparent, such as the much-publicized work of Balyi (Stafford, 2005), present some sound, clear requirements of development. However, how this developmental process is achieved or why it is done in this particular manner rather than another, receives significantly less attention and lacks empirical support. Indeed, as this review supports, we feel that much more is already known about the hows, whys, and whats of effective talent identification and development processes than currently utilized models may acknowledge, or even employ. Accordingly, this final section highlights the contradiction that is apparent between much current worldwide practice and the recommendations emerging from this review of literature.

Long-Term Coherent Messages and Support

Coherent and consistent practice appears to be the best way to build effectively toward aims, in this case long-term aims. However, evidence from a variety of areas shows that long-term agendas are not coherently reinforced across levels. For example, early selection is often highly valued, and important opportunities are gained from being successful in the short-term, inevitably influencing coaches to prioritize short-term development methods and selecting those who can perform well in the present at the expense of others (who perhaps have more long-term potential). The explicit nature of these processes is also important. For example, a typical funding policy is represented through Bristol City Council's Individual Performance Athlete Sport Grant program, where the aims are to help to develop local sporting performance and excellence. However, the criteria for successful applicants revolve around current demonstration of high level of achievement and performance standards through national age group ranking or membership of a national squad and give no allowance for those with potential but as yet unrealized performance standards. Thus, funding is often another mechanism that appears to reinforce short-term age group success over long-term development. Finally, coach reward systems that recognize success purely on winning at age group levels also reinforce a short-term agenda. Examples of this can be seen through such prestigious awards as the United States Olympic Committee (USOC) coach recognition program (2002) where coaches are publicly recognized for high achievement, defined by winning percentages, without any reference to the coach's ability to help individual athletes progress through the system to senior level, as measured, for example, by eventual success of the athletes coached.

As we have seen, assessment and reward are extremely effective motivators for practice, especially where recognition will inevitably lead to career development. Furthermore, the message provides poor direction to less experienced coaches and may reinforce poor practice, such as early selection and emphasis on winning, potentially at the expense of inclusion and long-term development for all. At present, we are unaware of any systematic approach to counter this obvious and unhealthy bias in the implicit reward structures for coaching.

Emphasis on Appropriate Development and Not Early Success

Unfortunately, there appears to be a widespread rush to identify and select children into specific sports from an early age (Kozel, 1996). Of course, the focus

on identification of talent at an early stage is likely to result in sporadic development opportunities for individuals. For example, research shows that the natural fluctuation of performance standards and development as children grow and experience different opportunities will significantly influence selection and deselection, especially where short-term success is valued. Indeed, many youngsters with no long-term potential will receive valuable opportunities at the expense of others. For example, in the German Tennis Federation (DTB, 1992, but a policy still in existence today), children as young as six are selected from mini tournaments and motor ability tests for development training. In fact, internal inconsistency is yet again apparent as the DTB also lay down the need for 90% generic movement skills and 10% competition until the age of 12!

Furthermore, throughout the age levels, tournament performance appears to be the key for gaining training opportunities, funding, and resources. Coach recognition systems compound this focus on early performance levels by rewarding successful coaching based on annual league results and ranking positions in age groups as young as under eight. The variety of pressures for short-term success is apparent in many other sports systems throughout the world, although substantial theoretical and empirical evidence suggests this is likely to significantly damage efforts to increase participation and develop talent long-term.

Although recognition of the educational need to develop fundamental movement skills at a young age is growing (Moore et al., 1998; Stafford, 2005), there is little evidence to suggest that either sport specific pathways or school education systems provide such a service. Indeed, in recent years, problems appear to occur even where programs do specifically aim to develop generic skills. For example, McClymont (1999) suggested a model of Talent Identification and Development for New Zealand where generic training is provided only after selection, somewhat contrary to the rationale behind it in the first place. In other words (if somewhat circular), it is extremely difficult to identify potential in a youngster who has never received training in the skills tested to identify potential! Furthermore, as generic skills underpin the development of more sport-specific skills, it appears sensible to develop those first in as many children as possible before attempting to identify those who may have potential.

Additionally, given the importance of mental skills for performance and development, there is a surprising lack of emphasis and guidance within development programs. While some more proactive bodies such as British Swimming (Gordon, 2004) have started this process by including psychology at an introductory level for swimmers between the age of 11 and 18, the issue of nonparticipation through early adolescence (Parrack, 2002) shows clearly that much more needs to be done. Unfortunately, some governing bodies combine this more holistic developmental approach with TI programs based on limb measurement and BMI, offering further evidence for a lack of coherence in methods and philosophies used.

Integrated, Holistic, and Systematic Approach

Even with an increasing recognition of the need to integrate many aspects of training, the lack of coherence and practical applicability often appears to create problems, a simplistic example of how some attempts to individualize and provide

systematic approaches have fallen short. For example, the Scottish Hockey Union (2004) utilize observation sheets in order to monitor individual progression of players in a variety of important factors, including cognitive components such as decision making. However, the criteria for observation are not explicit and therefore the test-retest and interrater reliability would inevitably be rather low. Furthermore, decision making is not addressed at all within the accompanying hockey skills record cards, nor are any of the skills that are tested integrated with decision making. Although it is understandable that simplistic tick box skills assessment make many coaches feel secure, given the extent to which assessment (and subsequently selection) drives motivation and development, and the key importance of decision making to invasion games, these tools only appear to serve in reinforcing the unidimensional and compartmentalized methods of skill learning that sport should be trying to eliminate. It appears crucial that more coherent and systematic efforts to target and reinforce key issues of integration need to be made at a variety of levels. Some attempts are being made to develop coach education through links with top universities; however, technique development still dominates many coach education programs.

Individualized, Ongoing, and Systematic Development

While issues such as flexible systems and individual development are highlighted as key concerns, at best, individualization tends to be developed only at the advanced stages. For example, the British Squash Prospects Management program (Milton, 1996) provided an holistic and individualized package of support to players who have decided to make squash their living. However methods of maximizing individualized training at all levels needs to be further explored, for example, through programs such as **sports**cotland.org's Developing the Potential of Young People in Sport project (Randak 2003). Flexibility in development systems appears to be particularly difficult when there is a large gap between the quality of experiences between club and select squads. This gulf makes it extremely difficult for a developing youngster to catch up once they are out of the loop.

Conclusion

We hope that this broad review of literature has provided some clear and integrated themes that are associated with effective development processes, future research guidance, and inspiration for debate. The final section of this paper has provided a flavor of how many aspects of current practice from all over the world contrast with findings within the literature. This initial insight into the nature and contrast between current practice and theoretically driven concepts of effective talent development supports the need for future research to investigate elite coaches and developing athlete experiences of effective talent development. A triangulation of data based on theory and insight into effective practice from both a coach and athlete perspective could inform current practice in a powerful way, providing guidelines for talent development at a variety of levels. Work is currently underway to provide these necessary components for the generation of a more comprehensive picture within the UK.

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APPENDIX 2

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Effective Talent Development: The Elite Coach Perspective in UK Sport

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Research to effectively inform the design and conduct of talent development environments (TDEs) is sparse, especially relating to the goals and systems involved. Accordingly, this paper provides a detailed picture of effective goals and systems within TDEs in a UK context. A thorough examination of the goals, nature, and systems of 16 coaches with significant expertise in talent development was carried out across 13 different sports. Inductive and deductive analysis revealed support for five main generic characteristics of effective TDEs: 1) Long-term aims and methods; 2) Wide-ranging coherent messages and support; 3) Emphasis on appropriate development, not early success; 4) Individualized and ongoing development; and 5) Integrated, holistic and systematic development. Implications for applied practitioners, policy makers, and researchers are explored.

Talent identification and development (TID) is currently big business. Undoubtedly, effective systems will help enhance the quality and sustainability of our elite level teams, bringing with it large financial rewards and recognition. First-class TID systems capable of delivering highly able and prepared athletes to the senior level are particularly important against the backdrop of ever-increasing professionalism and standard of world-class performance in the modern era.

Research has already explored the characteristics and influences of those who succeed in developing to, and staying at, the top level of international sport. So we have some depth of knowledge about the characteristics that need to be engendered. For example, work has been carried out to identify the characteristics of elite level performers (Bloom, 1985; Gould, Dieffenbach, & Moffett, 2002; Talbot-Honeck & Orlick, 1998), the characteristics of successful developers (Abbott & Collins, 2004), and the range of influences on the development of Olympic champions (Gould et al., 2002). However, the higher-order goals

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and systems for coaching and talent development environments (TDEs) that optimally develop these characteristics are less clear. To date, coaching research has mainly focused on participation promotion in sport (Douge & Hastie, 1993), and perhaps surprisingly, there is little consideration of effective TDEs, which essentially drive the TID process.

Of course, it is important to remember that there are many more factors involved in the development of talent than just the direct process of coaching itself (Bloom, 1985; Gould et al., 2002). We must recognize and incorporate a whole range of influential factors, some of which are crucial for influencing young people directly (e.g., parents), and some that have more over-arching and systematic influence on the entire process, such as our culture and sporting policies. However, the TDE is certainly the most consistent and immediately controllable factor in the life of a developing elite and, given the high levels of resource, its important and central role is acknowledged by sports, institutes, and governments alike. Therefore the purpose of this investigation was to examine the goals and systems that characterize effective TDE.

In fact, guidance is available for this crucial issue within current research. A review by Martindale, Collins, and Daubney (2005) looking at a broad range of relevant literature, including both theory and empirical work, yields several likely key characteristics of effective practice, which emerge consistently across the different sub-disciplines considered (see Figure 1). Interestingly, when the literature-based recommendations are compared with examples of current practice, many (not all) show a significant disparity. For example, while it is clear from the literature that talent emerges with the right experience (Bloom, 1985; Simonton, 1999), many still insist on providing funding and development opportunities to only a few select youngsters, based on current performance level. As an example, the German Tennis Federation (DTB, 1992) select children as young as six from mini-tournaments and motor-ability tests for development training. Further, while the recognition of the need to develop fundamental movement skills at a young age is growing (Balyi, 2004; Moore, Collins, & Burwitz, 1998), there is little evidence to suggest that either sport-specific pathways or school education systems provide such a service.

The breadth and depth of literature underpinning these characteristics of good practice supports their use as a structure, which may guide further investigation. As such, prior to the examination of expert perceptions of effective TDEs, it is worth offering a brief summary of these points (for a full review see Martindale et al., 2005). First and second, the need for the promotion of long-term aims and methods and wide-ranging coherent messages seems clear (Bloom, 1985; Gould et al., 2002; Siedentop, 1978). Unfortunately, operationalizing and implementing these laudable and well-justified aims has proved elusive. In a UK context for example, it has been highlighted that creating truly coherent long-term aims and methods is difficult due to the incoherent structure and strategy behind sport as a whole (Cooke, 1995). This is apparent in a variety of challenges faced by sports; for example, consider the following quote: "Elite junior to elite senior is very poor, we have a massive drop out rate and a large talent pool wasted" (UK Athletics Website, 2003).

Third, appropriate development must be prioritized over the all too common drive for early "success", where selection and coaching procedures focus predominantly on winning (Abbott, Collins, Martindale, & Sowerby, 2002). It is well-documented that the vast majority of those who become extremely successful adults did not start as equally talented young performers. For this reason a dominant focus on early success and all the coaching, identification, and selection issues that this brings is simply not the most effective (or even ethical) way of producing senior success. Bloom (1985) highlighted this by stating "even in retrospect, we do not believe that the perfecting of aptitude tests or other predictive instruments would enable us or other workers in the field to predict high-level potential talent at these early ages." (p. 533). Effective processes appear to highlight the need for the systematic development of

Figure 1. The model of effective talent development environments (TDEs) emerging from the literature (Martindale et al., 2005).

fundamental physical and movement skills, such as catching and balance, (Moore et al., 1998; Schmidt & Wrisberg, 2004) and fundamental attitudes and mental skills, such as commitment and persistence (Bloom, 1985; Gould et al., 2002; Talbot-Honeck & Orlick, 1998). These appear to be the pre-requisites for the development of more sport-specific skills and continued progress through the transitions associated with achieving excellence (Bloom, 1985; Van Rossum, 2001).

Fourth, there appears to be a need for individual and ongoing development opportunities (Abbott & Collins, 2002; Ericsson, Krampe & Tesch-Romer, 1993; Gould et al., 2002) stemming from the complex dynamic of individuals, their progress and success (Abbott, Button, Pepping, & Collins, 2005; Moore et al., 1998; Simonton, 1999), and the unpredictable nature of individual development in many aspects, not least physically and mentally (Ackland & Blanksby, 1996; Sinclair & Orlick, 1993). Indeed, individual treatment is vital for effective change in behavior in many aspects of life (Prochaska, DiClemente, & Norcross, 1992), and factors such as goal-setting, review, and reinforcement appear to be important to encourage this change process (Locke & Latham, 1985; Siedentop, 1978).

Finally, effective practice appears to require integrated, holistic, and systematic development (Burwitz, Moore, & Wilkinson, 1994; Saka, 2003) due to the complex, dynamic, and multi-layered nature of development (Abbott et al., 2005; Simonton, 1999). Some of the methods associated with these five key characteristics are apparent in Figure 1.

In summary, given the high level of "real world" interest in the identification and development of talent, and the lack of empirical data that exists for the examination and guidance of TDEs, the first purpose of this study was to reveal experts' perceptions of the goals and systems that are required to implement effective TDEs within a British context (note that these perceptions may or may not typify current practice). Subsequently, the second purpose of the study was to examine the extent to which expert opinion was consistent with the model of guidance apparent in the literature (Martindale et al., 2005), with the aim of providing a more substantial evidence base for the delivery of best practice. Indeed, if clear and consistent results emerged, guidelines for good practice may be more usefully developed and disseminated, at least within the context of the investigation (Peshkin, 1993).

METHOD

Participants

To secure an accurate picture of best practice, it was essential to recruit a representative sample that could justifiably be considered expert. Accordingly, the sample consisted of 16 elite development coaches from a variety of sports including athletics, canoeing, curling, cycling, equestrian, (2) soccer, hockey, judo, netball, (3) rugby, shooting, swimming, and triathlon. They were identified as expert talent developers through four criteria.

First, the UK Sports Institute (UKSI) recommended the coaches as exemplars of good practice at developmental and elite levels. At the time of the investigation, the UKSI Coaching Support Team was focused on the evaluation of high-level coaching nationwide, as a precursor to the development of structured support for National Governing Bodies (NGB). The audit process completed as a part of this evaluation offered them an informed perspective across sports. Second and subsequently, this view was confirmed through interviews with other elite-level coaches and senior coaching directors within each sport, who were independently (i.e., blind to the UKSI nominations) asked to provide a list of suitable candidates. In all cases, this input supported the UKSI view. Third, the nominees' standard of work and criticality was recognized and rewarded within their sports through their appointment as mentors, acting as designated

role models for effective practice within their respective sport's coach development structure. Finally, all participants had a record of success in the development (from a maximum age of 16) to elite status of athletes in their respective sport; additionally, and to confirm their current status, all were currently working with elite and/or development athletes. Demographically, 14 of the coaches were male and two were female; 12 were British, two were Australasian and two were European. Furthermore, 10 of the coaches worked with males and females, one worked with females only and five solely with males. All coaches had at least 10 years of coaching experience and had represented at high levels of performance as athletes themselves.

Design

A qualitative methodology was selected to gain an in-depth understanding of the experiential knowledge of talent development (TD) experts. The qualitative process identifies that the "main goal is to reduce the amount of data and obtain a unified picture of the phenomena under study" (Cote, Salmela, Trudel, Baria, & Russell, 1993, p. 130). To maximize the chances of gaining a complete picture of the nature of effective TD, a semi-structured interview was developed, consisting of nine open-ended questions, carefully structured in an attempt to elicit truly open-ended responses (Patton, 1990). The questions can be seen in Figure 2.

Pilot interviews were conducted with three international-level coaches (triathlon, rugby, basketball). Feedback obtained from these interviewees, in addition to critical appraisal by the investigators, was used to evaluate and refine the interview guide. This evaluation process, in addition to recommendations from Patton (1990), was also used to help guide the interviewers away from biasing coaches' responses by ensuring the use of a neutral, impartial stance when probing participant responses and also to maximize rapport, comfort, recall, and open responses (Backstrom & Hursch-Ceasar, 1981).

Procedures

After the expert status of the coaches had been identified, they were recruited by personal contact. After informing them of the nature of the investigation, and providing assurances of

1. Could you give me an overview of what you do when you coach development athletes?
2. How does this contrast to what you do when you coach elite athletes?
3. What factors do you think characterize someone who has the potential to become elite?
4. What are the stages that someone has to go through to progress from novice to elite in your sport?
5. What do you do at each of the stages?
6. Could you tell me about the complexity of what you are trying to do at each stage?
7. Could you tell me about your use of 'others' within each stage?
8. Does your National Governing Body offer clear guidelines as to the levels/skills etc. expected by each stage?
9. How effective do you think current talent development processes are in your sport?

Figure 2. Interview questions.

anonymity, all agreed to take part. The main interview questions were sent to the coaches before the interview in order to allow the coaches to familiarize themselves with the types of questions that would be asked. All interviews lasted approximately 120 minutes and were tape recorded for later transcription. To ensure a full investigation into their perceptions of the nature of effective TD, each coach was asked an identical sequence of questions (as outlined above); however, to gain an in-depth and full understanding of the meaning of all responses, clarification and probing were used as required for each individual coach (Patton, 1990).

Data Analysis

Analysis followed the processes outlined in Edwards, Kingston, Hardy, and Gould (2002) utilizing both inductive and deductive analysis. The initial inductive approach utilized hierarchical content analysis, as outlined clearly by Cote et al. (1993) through three stages: 1) coding experience; 2) inductive inference; and 3) similarity processes. Themes and categories that emerged from the data (Patton, 1990) are represented and supported by quotes in the results section (Cohn, 1991) and are presented in the Appendix.

The subsequent, deductive analysis used a pre-determined set of themes and categories to organize the data (Patton, 1990). Specifically, within this study the deductive analysis was used to assess the extent to which the views gained supported the theoretically and empirically based model that emerged from the literature (see Figure 1). It was recognized that there are difficulties in generalizing data from any qualitative research, indeed, "it is impossible to generalize in a scientific sense at all" (Guba, 1978, p. 68), even when a diversity of participants are covered, in this case, a variety of different sports. However, it is also important that "the evaluator should do what he can to establish generalizability of his findings" (Guba, 1978, p. 70), and as such, it was deemed useful to examine the extent to which the findings supported more widely developed TDE criteria, as emerging from the literature. Perhaps, if consistent support was clearly apparent, the user generalizability of the emerging factors would be enhanced somewhat, at least in the sense of highlighting the need to critically consider their value within any TDE (Peshkin, 1993).

Establishing Trustworthiness

Several steps were taken to establish trustworthiness. First, steps were taken to maximize the levels of open-ended responses (as outlined above), and two researchers carried out the interviews to reduce the personal bias that a single researcher may bring. Second, a report of the results was sent back to each coach to establish credibility of the findings through stakeholder checks (Patton, 1990), from which no one reported any required changes. Furthermore, two different researchers carried out reliability checks (Scanlan, Ravizza, & Stein, 1989). This involved raw data quotes being coded into raw data themes in 10% of the interviews, followed by matching all the second dimensions to their third-dimension themes and matching all the third-dimension themes to the general-dimension themes. Finally, the results of the reliability and validity checks were discussed by all four researchers, which acted to finalize details and the emergence of the appropriate themes.

Deductive Model and Theory Examination

In accordance with procedures used by Edwards et al. (2002), based on the transcripts and the understanding gained from the process of the qualitative analysis, two of the researchers deductively analyzed the data in direct consideration of the five key characteristics of effective TD practice that emerge from current theory and empirical research (see Figure 1). The data

from the 16 coaches were individually analyzed, and the researchers assessed the extent to which they provided no support, some support, or support for the model (see Table 1). "No support" was defined as no evidence of the importance of the theme; "Some support" was defined as evidence supporting the importance of the theme and use of less than 50% of methods, and finally; "Support" was defined as evidence supporting the importance of theme and over 50% of methods.

RESULTS

The themes and general dimensions that emerged from the inductive hierarchical content analysis are inherent in this section (Cohn, 1991) and are presented in the Appendix. Quotes are used to enable the reader to gain a better appreciation of the context in which the themes emerge from the data.

Clarity and Consistency of Philosophy, Objectives, and Methodology

Coherent Long-Term Aims and Methods

It was clear from the data that long-term aims must be consistently prioritized throughout the development system to prepare explicitly for senior success. In fact, in many cases junior performance levels appeared quite unrelated to those at the senior stage; a factor which participants recognized through their respective system:

> "I'm a successful 'age group' coach, I've won all my 'sport' games". Well, great. And the best thing to do is just to sweep it all away and say no, we'll leave our selection later . . . what we're really wanting to do is select from our senior club sides, and junior internationals; by junior I mean under 21.
>
> A lot of former world junior champions don't stay in the sport. They don't make it or they stay in the sport but they don't seem to go on to greater things. There are exceptions of course but again looking at the Aussie model, we think they tend to push them too hard too soon and basically burn them out. There are other reasons so we try not to take a softly softly approach but we try to take a more long-term approach to keep them in the sport longer.

A systematic process designed to progress athletes step-by-step was highlighted, where pressure to win at each stage was detrimental to long-term development. For example, those with potential can be missed and deprived of opportunities due to a lack of current performance standard, together with coaching aims and methods which lack long-term developmental focus:

> I watched the trials last year for the under 13s. They picked the particular mode of players it wasn't close to what I would have picked. And I have international experience . . . I'm not saying I would disagree with them in terms of getting the result that year, but I would have disagreed with it in terms of long-term development.
>
> The most important principle is that anything that I teach them has to work when they play senior international 'team sport' . . . what you do is you furnish them with the techniques and the decision-making powers to be able to survive for the next level up.
>
> We sent some under-17's to Australia . . .they were sent there not as a team at all, they were just sent there as a bunch of players who went there to have an experience. Now that's just totally unheard of in the England stuff, so there's some massive changes [needed] within 'sport'.

Finally, it was appreciated that not everyone can make it to the top; in line with this a strong educational ethos was also prevalent. This is highlighted by the following quotes:

> When dealing with a young person you are laying the foundation both physically and mentally for them to take on the world for the rest of their life.
>
> We look to produce a senior international player if they have the ability. If not, the aim and objective is to get them to be competent enough that they can join a club, the senior part of a club, and enjoy the 'sport' for the rest of their life. And that's just as worthy an aim.

Clear Expectations and Links to the Senior Level

For a long-term agenda to be successful, it was reported that those involved in the development process need clear expectations and understanding of the dynamic nature of TD. For example, age-group squad selection is not an automatic ticket to senior status, athletes may move in and out of squads and late developers have opportunity to become successful:

> We need to be very direct and say that we do not want to be selecting players, I don't mind them being identified and given training but it shouldn't be a situation where other people can't come into that group as they become good enough. But getting people into that group late, they're entering a very threatening environment to people already established and the psychological handling of that needs to be spot on. There's an acceptance that, well I hope there is now, there wasn't before, but my belief about squads is that about half of them will carry on next year. About a quarter to a third will drop out for whatever reason, and then there's another group that have just come in that are just starting the process . . . and some players will go from the third squad straight up to the top squad, and that's happened. And it's being able to recognize when they're ready.
>
> The fact that they get in the nationally identified program, it starts to become like, "I've got in this now, and I'm just going to keep stepping up until I get to the national side." And that's why that way that you set them up becomes very, very important, that everybody knows that you will only be in here as long as you're improving and the opportunity's there. And some day you might drop out of it, you could come back into it, and it's very fluid. If it's set up like that it's very good.

Furthermore, this openness was seen to provide realistic expectations, standards, and goals for all involved, including direction and attitude for long-term development. However, this message must be reinforced, through for example appropriate coach reward systems:

> You'll not stop that [praise for winning age group competitions], but the thing to do is to make sure that either that the system doesn't exist which is the first thing I would advise, but if you insist on the system being in place, then what you have to do is you have to track some of the players through and give praise to those county managers who actually produce the junior players.

Importance of Education, Integration and Use of Outside Influences

The data suggest that it is important to educate a variety of people to ensure that every influence is coherent. This included many people such as parents, coaches, peer groups, other role models, teachers, schools, and society as a whole.

> We need to ensure that the other people who are working with them are providing what's required, which is difficult. Kids are at school and they're not getting either the 'sport' training or the values or the home environment's no good.

> The biggest single problem I have as development coach is the kids have three or four different people talking to them about their game and as a result it leads to a lot of confusion. They become more skilful at doing the right thing for a coach that's stood in front of them than actually improving. And that is because the whole system is disjointed, split between school and club, split between international, divisional county club, and school. A player could play conceivably at every one of those levels.
>
> One of the things that is very obvious in looking at young players is that 90% of the time the ones that make it through have got good solid advice at home. Because whether we like it or not, as coaches we see them for four or five hours a week, the parents see them every evening.
>
> Once again it's the education that we've got through to the teachers, to the parents and we need to get it through to the coaches and the youngsters.
>
> They took the coaches out of the club system and in taking the coaches out of the club system it meant as a regional coach you did a one-off development session with a player. But when it came to the weekend, that work wasn't then reinforced.

Finding systematic ways of influencing and utilizing as many people as possible was also considered important, and participants offered a variety of methods including formal education days, informal contact, large education initiatives, practical coaching education, websites, booklets, use of peers and role models, positive involvement of influential people (e.g., parents), and integration of coach practice and support staff to allow cross over of information and ideas. This is supported below:

> When they went to play the game again I brought him over and said, "I'm going to get your dad on the Sunday to do a count of how many times you get on the ball, and we're going to keep a score, your dad's going to start tonight. He's going to see in this game how many touches you get." And he was fine, he was much better.
>
> We are always discussing our players, right the way down to the elevens and twelves and when we go to a game, or when we go somewhere away, what we do, or we sit in the office. Because we all take teams you see. I take the under-14 team, X takes the under-16s team and the under-15s, and Y takes the under-12s, and we've got players who take teams as well. So we all take teams, we all know the other kids as well.
>
> You need to educate the parents, you need to get them in and you need to talk to them about the sort of factors where they're gonna raise in their heads . . . have a quiet informal chat on the side of the pitch. And parents can then hint to their kids about what you're looking for and that just helps the process.
>
> For me, the best way to do it is the way I came through the system, which is good schools, good physical education teachers, letting you have a go at a lot of sports and giving you the opportunity to go where you need to go to progress, be it a club or whatever, but it all starts with the schools. I think the advantage of the school over the club situation and producing young players is that they come across other very experienced and talented staff who teach them all sorts of other qualities . . . talented people who will teach them all a number of things about life and living, take them on trips, do this, do that.

Systems Facilitating Promotion of Player Development

Individual Programs

A simple, but key and oft-stated concept was the need for individualized development. This is important throughout the process, from needs analysis to development programs. Due to the individualized nature of development, every individual had their own personal formula for success and personal requirements in terms of the skills and experiences that ultimately will be most useful. This is highlighted below.

> Challenge them in a way which suits them, because I think it becomes very individual you know. I think it's where team sports break down entirely. The team is pushed far too much and the individual isn't, that you need to get the best out of people.
>
> You really judge each athlete on their individual merits, you know their stage of development. You know the rest-recovery needs of one will be probably a lot different from another one. So a lot of one-to-one attention is needed.
>
> You've got to treat them all individually, that's how we had to get every single player here as an individual program. There are no group programs.

Ownership, Autonomy, and Self-Motivation

Participants reported that developing athletes needed to take, and be able to take, an increasing amount of responsibility for their own development and performance as they grow as athletes and people. This was thought to be necessary to reach the levels of commitment, learning, and hard work required for eventual high-level performance. Skills such as self-awareness, self-motivation, autonomy of learning, and self-responsibility were identified as crucial. The participants offered examples of ways in which this could be done including: allowing an appropriate level of ownership over goals and reviewing processes, delegating responsibility for life and athletic development, letting athletes make mistakes and helping them to learn to develop from them, not giving too much feedback too much of the time, promoting self-awareness through questioning and appropriate feedback systems, and systematic education of the whys and hows of development and performance. All participants endorsed that this takes time and patience:

> I'd challenge the athlete to find their way of doing what I know they've got to do. So, that's part of the challenging culture. It's not good either, giving too much away, but more and more, the athlete will take responsibility of his or her own actions the better. That's the best way to learn.
>
> Ownership and self-awareness, I just feel players who are directed all the time lack self-awareness and don't develop, you know, become robotic, whereas if he can get an understanding (of) the way to design drills, the why you do them, to have a clear model of the skills that they're trying to work on. . .if you can get that sort (of) understanding then you've got players who can self-coach and they can go out any time and do the drills.
>
> You've got to take responsibility yourself to develop the skills or whatever it is that you haven't quite got hold of. So I think the tendency to, definitely you can (do) too much with people, you know, take them to the water too many times.
>
> As a coach you often get asked and you are very willing to give advice because you have been through that whole thing yourself as a person most likely. Also you have had other athletes that have gone through. Now again, like in all coaching, it is very dangerous to point out too many of the pitfalls that you might know yourself through your own experience because that to me pre-empts the learning curve.
>
> Explain to you why they made the decision and then you say to them well what were your other options? Why that possibly, that one could have been a better option? And they've gotta understand why because if they understand why they will then try and change their habit. So that is an important stage.

Ongoing Review and Goal Setting

The data highlighted that a systematic process of goal-setting, developing, and reviewing was crucial to promote change and to monitor and help an athlete through their unpredictable development. When these processes are effective, they provide integrated direction and purpose, feedback, and opportunities for the development of intrinsic motivation and ownership. This ongoing review and goal setting process was seen as both formal and informal, and from team to individual, ranging from end-of-season reviews

through to fortnightly meetings to "a word after training," as implied by the quotes below:

> We sit down, we have one to ones, we identify what key skills, key positional requirements, mental skills, together with the player, we determine from that rating what we've got to work on most, we help design activities. We then re-measure them (to) see if they have improved a bit, it's just a continuous process of identifying what's needed and then delivering it.
>
> You've got an ongoing process of planning, looking ahead, reviewing, monitoring, planning, reviewing, and it goes on all the time then I think we're continually adjusting to the demands being made on the player.
>
> We do one-on-ones with players to look at the game as we feel it's needed or as they feel its needed, so I won't meet every week but every three weeks, I would say, I'll have met with every player either within a mini unit or individually to look at the game, look at what they need to improve, particularly if they are not being selected.

Importance of Informal Player Coach Interactions and Set Up

The role of this regular and informal communication was a particularly important feature. The informal nature of many interactions was not seen as a replacement of formal meetings, but as a vital extra. The relaxed nature of these meetings more often than not resulted in sharing of important information and a building of trust, factors seen by participants as key for effective development. The following quote reinforces this:

> Ring them occasionally, sit down and have a beer, have a coffee, particularly with two or three of the more senior players in the side. Have a check, you know how you think things are going; this and that and the other. And then you run into others at various other times and places and that's an opportunity to have a quiet word with them more. And obviously you stop people pre- and post- training, pre- post- match times. I believe to be honest with you that rather than a lot of formal situations that informal is best . . . That's what makes the whole team stick together, that communication. . . .It's just a chat and it's a non-threatening environment. They'll tell you loads of things. Then you can get to know the players that bit better and know what makes them tick.

Balance

The participants emphasized that creating balance in the athletes' lives was extremely important for sustaining successful progression. Particularly, developing an athlete's ability to relieve stress resulting from life and/or sport and develop effective mental and physical recovery plans would help prevent burnout. Furthermore, encouraging a balance of outside activities could also help athletes to see themselves from a more rounded perspective, and prepare them for the outside world:

> I think certainly at a younger age, if you looked at some of the academy models around, particularly in football, something like Ajax they work really hard on the values, on the balanced lifestyle, the values and develop character.
>
> I think they're (education/work/leaving home, etc.) part of the challenge as well. I mean X went to university, went home because he had to do the Commonwealth Games to do and various other things like that. So the competition structure didn't sort of endorse the university situation. But no, I think generally speaking those are the little challenges around and it's part of growing up.
>
> You might have to defocus them, to teach them how to relax, to teach them how to not over-train, to get them into the mental stage where they are not overdoing it.

De-Emphasize Age Group Success

It was highlighted that de-emphasizing age-group success was a crucial concept for influential people to understand and implement within any TDE. For a variety of reasons it was seen as extremely difficult to identify those who will eventually reach the top, and without a change in emphasis on age group "success," problems would continue to exist in selection, coaching and funding opportunities, aims, and subsequent experiences:

> You can be player of the year at 13 or 14 years of age, you can be a star. And then at 16, 17 years of age you can't get a game on your team, because the boys have just overtaken you.
>
> There's two players here that missed out on representative teams when younger, late developers, they are now first teamers.
>
> The other thing I would say is advice to the governing body to keep large numbers of kids involved, I would get rid of County 'team sport' juniors. I would do some divisional 'team sport' at the age of under 16 but not until that stage, because all it does is it turns people off the sport, it's far too selective. Eleven get picked in the County, where there are actually 50 or 60 that could one day be great players.
>
> Now, invariably, the people who get picked at the bottom end of junior sport in the UK are those that have been coached earlier, started the game earlier, have got a head start, and they're not being rated with a future. They're being rated with a present.
>
> It's important to keep a look on players in general . . . I think it's very important at developmental level that (you) don't write off the ones that aren't there yet when they're 16 because you will find in 12 months things will change dramatically.

Role Models

Participants reported that peer-group pressure could have significant positive or negative influence on a young athlete. However, systematic utilization of role models was highly beneficial and the management of potentially negative situations is key. Positive examples included; mixing different close age groups at school or in the club environment, bringing in or exposing younger athletes to already successful elite athletes and or coaches, using video, targeting influential peers and utilizing them, reading biographies, or through mixed-age or performance-group meetings. The data suggested that this area is often not used to its fullest capacity and that is a large and exciting but currently missed opportunity:

> What we've done here at school which long time ago is double up the year groups so we have the under 13s and under 14s work together as under 14A and B. Therefore you have two years of 14s—one when you're learning and one when you're the boss! And that obviously helps the younger players on hugely at each stage. And also then gives them some leadership experience as well. And then they're more, you know, cock of the school so to speak, you know. And that's the way it should be.
>
> I would say my job is more as a motivator as well. To explain to kids there is a pathway to the job, there is a structure, I don't hide the fact that you've got to work hard, you've got some great role-models there, and we'd be delighted to have you guys pushing the people that we have in the institute here and it's not impossible. And give them some real-life examples of people who have already done that.
>
> University is the death nail to most players. They go, even sports universities such as Loughborough, and drink themselves into the ground. Two years later they are no better. They are fat, they are unfit and they will never then make the step.
>
> That's the way to disseminate knowledge and it has some meaning because they can see then that real people have issues and problems, things that need to be resolved and they have solutions to them. And they want to hear it from them because they're not listening necessarily

to myself or other coaches. But they will respect and listen to their peers and people they would want to compete with.

A player has just retired from international 'sport' and he's 27–28, he's a gold medalist and the Germans consider him to be their best player ever technically. And this guy's performance—the English guy playing with them—has gone up another two steps. He is twice the player he was two or three years ago. That's not to do with my coaching, that's to do with him having a very good role model.

Complexity and Integration

It was consistently reported that there are a wide range of factors that need to be considered in any TDE, ranging from an organizational level to decisions made by the coaches themselves based on individual athletes with individual circumstances. As the data have shown, under the surface there are many factors that interact and affect each other significantly, and consequently the process and decisions taken are highly systematic, integrated, and interdisciplinary. However, the participants stated that while the complexity of the process needs to be acknowledged, the end result and process needs to be kept simple to be effective and practical, as highlighted by the quotes below:

There are an awful lot of factors involved, which, if you like, we need to take the synoptic view to the players' development. Taking ideas in loads of different places and then simple advice from thereon in. I wouldn't say it's rocket science. I wouldn't say that you need to make it very, very difficult and intellectual.

They don't integrate their thinking and therefore their actions are not integrated either. Now, that's not a criticism necessarily of them as people. I think it's more of a system, the system of production of them.

It is complex and you have to be very systematic in the way you set things up. For example, by Wednesday we need to have individual reviews and unit reviews, a full de-brief of the game we've just played, and a look ahead at the next team. They've got individual responsibility to look for body language and things in the opposition team, what they can attack, what they can exploit, what they can expect. . .to achieve it you can't just be willy-nilly, you have to look at times and resources.

Not only is it important to be physically stronger, but I think psychologically it is a massive help. When you are physically stronger you are holding people off, you get to the ball a lot quicker and your confidence growths so psychologically you improve as a player. . .and if you are confident you'll be relaxed, if you're relaxed you'll play better etc. and it all goes hand-in-hand, there's nothing works without the other part.

Importance of Ongoing TID and Opportunities

Athlete Development is Individualized and Unpredictable

It was clear from the data that development within and between individuals is individualized and unpredictable. Hence, performance standards are often a poor measure of potential and this needs to be accounted for in any TDE.

Sometimes it could be how their body grows in the wrong way. It could be outside interests, they could lose their belief in themselves. How many times have you seen in different sports young people coming along and they have the world scene for 18 months and they're gone, you never hear of them again. Sometimes they might be gone a number of years, then suddenly come back.

What you get is at the younger end, we're going to select him for the first-year rugby team at stand off cause he's six feet six. And he's going to catch the ball and score tries for us. Or

he's a big lad, sometimes a lot of time is invested in these so-called big lads in the first two or three years of their game-playing career. Then all of a sudden other folk bypass them. And it's the wee dirt guy that's just been dogging in his training and all the rest of it and he's started to grow and become more physically mature. So I think people have to be careful.

It all depends on how they develop and I've seen some young people who were extremely talented as 12/13 year olds but by the time they have got to 18/19 they have lost their talent.

I have seen people who have developed and then stood still for 2 or 3 years and then suddenly things have kicked in and they've developed again. If we were capable of identifying that and bottling it, we would be winning everything. You can't, it is just how things go and develop and who knows what is going to happen.

Producing teams that haven't got enough power to actually play against the international sides, and yet they've got people that they've dropped out of the sport earlier because they thought they were uncoordinated or whatever, but they haven't given them the chance to grow. There's been some horrendous cases of that, where someone who's grown to 6 ft 2 or whatever isn't going to look the same as a 5 ft 2 person under the same conditions at 14 years of age.

Flexible, Open, and Ongoing Development Opportunities

The unpredictability of the development process needs to be supported systematically with flexible, open, and ongoing opportunities to as many youngsters as possible.

They (clubs) need 12s, 14s, 16s, 18s yeah. And you need as many teams within each of those brackets as possible. So you play for the under-12 fourth eleven. And that is the system that has been running in Holland and Germany for years and should have been running here.

At the younger group you're giving the widest possible group experiences, and just let them get on with it. Observe them while they're having those experiences, and then gradually over a couple of years you'll start to pick out who the ones are that are going to step forward. Now, they're the ones that you need to pick up.

Skills that Must be Promoted in Development Environments

The data showed that a wide variety of skills are needed for development. These included some more generic skills, such as fundamental movements, decision-making, life and mental skills. These were important as they provided a basis on which more sport-specific development could take place. Importantly, skills needed to be developed in an integrated manner to be successful. For example, technical skills must be learned in conjunction with decision-making to encourage transfer to a game situation. This process needed to be systematic but at the same time allow for natural ability to shine through. The variety of factors was necessary to promote effective performance and also effective progression, development, and life management. The quotes below highlight this:

Every skill you can imagine is applied.

It's just one of the skills along with conditioning, along with technical skills, along with technical awareness. But it's given scant regard in most outfits whereas I think there's a belief where you've either got it or you haven't mentally instead of an understanding that mental skills can be trained like physical skills. We've introduced programs here such as centering or mindfulness, visualization and goal-setting.

You can get someone with a really awful attitude, but the way I look at that is, that's changeable. You can't change your genetics, but you could change somebody's attitude.

But when the pressure really comes on there's always returning to rote under pressure which is why it's important to start the psychological stuff fairly young. But I'm not sure that that psychological stuff needs to be "lie on my couch" stuff, it's more practical psychology.

Table 1
Summary of Deductive Data Analysis

Key theme	No support	Some support	Support
Long-term aims and methods		3	13
Widespread coherent messages and support		1	15
Emphasize appropriate development not early "success"		2	14
Individualized and ongoing development		2	14
Integrated, holistic and systematic development		1	15

He's got to be able to run nicely. In other words, it's pleasing to the eye, smooth, balanced, able to change direction nicely, smoothly.

If it's 6–10 year olds the main aims would be to give fundamental movement skills.

Many people say that we need the best coach in the establishment is the head coach. But I disagree. For me, for me the quality of coaching I need this very low level. And I'd look at very good coaches for coaching the youngsters and bringing them through this process. Because if you get that process right, the end process is going to be very easy. If you don't get that right then the end process can be very difficult.

Basically what I was trying to do is to make them being athletes, so it means not 'sport' but athletes first—running, swimming, introduction on bike, gym work—but only introduction at some point. And my first concern was co-ordination skill first.

I think with the environment, using the right coaches, and the very solid work through the respect, the discipline, the passion about what is being done, a good technique etc, so that a person that comes into your sport can see a way forward. They can see that if they are good at that then the next stage is this and the next stage is that. There is adequate technique coaching taking care of them as persons and as athletes through each of these stages but without making them all into soldiers where they are all marching up and down. That to me is a very fine balance, it's the same as developing talent and bringing technique in without losing the talent. It is having a structure/strategic plan in a regimented way so that you are bringing things forward but still allowing for that individuality.

Results of the Deductive Analysis

As the table highlights, substantial support for the literature-based model of TDEs resulted from the deductive analysis (see Table 1). However, we feel it is useful as a brief summary to highlight that while no entirely new concepts emerged from the analyses, the coach data did support the need to expand two key aspects of the model. First, the key method concerned with "providing forums for open and honest communication patterns" would need to be expanded to emphasize the importance of incorporating both formal and informal coach-athlete interactions. Second, the key method "provide regular individual goal setting and review processes" would also need to be further expanded to emphasize the importance of providing individualized programs. (For a more detailed view of the features of the literature-based model see Martindale et al., 2005).

DISCUSSION

The results section is, by decision, very detailed, and we feel that the inherent messages ring loud and clear. Before considering some of the many implications however, it is important to highlight the limitations inherent in the study, which must be considered against the comparatively clear results which emerge.

For example, a small number of coaches were involved ($N = 16$) and, perhaps to be expected as with any attempt to summarize and condense findings, not all coaches promoted each of the generic factors in exactly the same way or to the same extent. Additionally, agreement between participants was, quite understandably, "clouded" by the sport-specific context in which they worked. Third, other important groups, such as athletes and parents were not included in this work. Such a triangulation of information would be extremely useful, indeed some of which is currently being undertaken in an attempt to strengthen our understanding of the requirements of effective TDEs. Finally, we recognize that the issue of generalization is important, as in any qualitative investigation.

In support of the data however, the nature of both participants and analysis must be considered. First, the selection criteria so carefully applied obviously limit the sample size. Thus, the group is drawn from a comparatively small subset of coaches but, in the current context, could justifiably be seen as offering an expert opinion on TD in the UK. As such, their opinions would seem to hold important advice for others; the selection criteria for inclusion certainly support this view.

Second, theme consistency within the data must be considered. Throughout the investigation, and reflecting good practice in qualitative work, we took careful steps to avoid any leading of participants. However, clear and consistent guidelines emerged from this diverse sport sample, which demonstrate a clear coherence with those themes obtained from other research. Thus, qualitative limitations notwithstanding, this extended level of support is presented to enhance the user generalizability of the findings by providing the reader with the best possible description of effective TDEs (Peshkin, 1993). We present both message and methodological caveats, allowing researchers, coaches, and policy-makers alike to use this work as a critical base on which to review, research, and develop practice.

With these qualifications in mind, four important factors emerge from the data, over and above the clarity of systemic considerations which is the primary message of the results. First, the need for an integrated, pan-stage system was a clear and consistent suggestion from all participants. In the present study, the context of effective TDEs (defined as that which aids the development of those who have been identified as talented) was associated mainly with academies and national age group standards. However, emerging from this developing picture of TDEs is that many, if not all, of these factors apply across a wide variety of development experiences such as school and club systems. To highlight this point, one participant in the study (ex-international head coach) was currently (and extremely successfully) coaching his sport using the same ideas at school, club, and age group levels. The data support the contention that the most effective mechanism for change and influence would be able to consider the athlete and their experiences as a whole, whereby the overall philosophies and features espoused in the model would reverberate from "the top" right through every youth experience, a situation only possible with the influence of those with power to change sport structures and education (e.g., policy-makers and governing bodies). Furthermore, the full context of the process appeared to require consideration of what happens before this stage. For example, this study also supported the well-documented need for an early stage where fun, passion, and fundamental skills (physical and mental) are introduced to all youngsters as a prerequisite for effective future development.

Notably, the lack of effective foundations was a common concern for the UK coaches, in both what and how skills were taught, a view that has been documented before (Moore et al., 1998). In line with this, the issue of when youngsters should be selected (or not) was key, and while selection is needed eventually; the timing, rationale, and development experiences associated with it were promoted by participants as requiring special consideration.

Second, due to the recognized notion of late developers and the dynamic process of development and performance, supported by other research (Abbott et al., 2005), a depth of quality systems would sensibly be in place, outside of any select experience, to sufficiently aid those with potential who, for whatever reason, may be overlooked by often premature early selection.

Third, the data highlight a number of UK system-specific problems, including a lack of coherent aims between levels of development and clear long-term pathways; poor communication systems; lack of funding; potential detrimental effects of University lifestyles, and a lack of a "cultural mentality" for hard work, self-responsibility, and self-improvement. We leave it to the non-British reader to decide whether these issues apply to their own setting.

Finally, the nature of this report as an achievable but yet-to-be-reached ideal must be stressed. For a number of reasons often outside their control, not all of the emerging factors were currently practiced coherently, or at all, by the participants: Nonetheless, all were factors that the coaches believed were important for effective practice. For example, all believed parent education was important, but due to resource limitation it wasn't currently happening. However, the five key goals and systems that emerged were representative and provided a model for effective TD practice and critical reflection.

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APPENDIX
Hierarchical Model of the Inductive Analysis

Sub-theme 1	Sub-theme 2	General dimension
• Get players to and winning at senior level • Prepare 'kids' for the rest of their lives • Develop 'kids' to be good enough to join a club/ stay involved in sports • Promote and develop coherent aims and messages across school/club/country • Ensure players understand standards expected of them and provide clear and relevant aims at their level in relation to long-term achievement	Coherent long term aims and methods	
• Ensure players understand standards eventually required	Clear expectations and links to senior level	Clarity and consistency of philosophy, objectives and methodology
• Maximize player contact and involvement with senior players and coaching staff • Ensure coherent long-term aims through the system • Ensure coaches 'talk' and integrate at all levels • Promote education and 'use' of parents • Promote education and 'use' of teachers • Promote education, integration and communication between a variety of coaches	Importance of education, integration & use of 'outside' influences	
• Promote integration with a wide variety support staff: 'Team of Support' • Utilize the influence of peer group • Provide flexibility and support for athlete's work or education demands		
• Be systematic and individually focused • Allow for individual differences within needs, strengths/ weaknesses and developmental program	Promote individualized programs	
• Promote player self awareness • Promote player ownership • Promote independent learning • Promote self responsibility	Develop player ownership, autonomy and self motivation	
• Promote and check player understanding	Ongoing review and goal setting for player improvement	
• Set up non-threatening, informal interactions—more opportunities to find out about and help athletes • Create open and honest two-way communication	Informal player/coach interactions and set up	
• Provide overall balanced development within sport		Systems facilitating the promotion of player
• Encourage lifestyle balance	Balance	
• Target emotional and physical recovery		Development
• Many age group teams too selective too early • Create opportunities for all to develop • Individual differences in 'development'—must focus on individual development not squad/team performance	De-emphasize age group success	
• Coach rewards must focus on bringing players through not win-loss record		

(*Continued on next page*)

APPENDIX
Hierarchical Model of the Inductive Analysis *(Continued)*

Sub-theme 1a	Sub-theme1b	Sub-theme 2	General dimension
• Parents as role models • Peers as role models • Teachers/schools as role models		Utilize the effects of role models	
• Senior performers as role models • Older/more experienced peers as role models • Coaches as role models • Reinforce skills through a variety of means		Systematic and integrated teaching and reinforcement	
• Promote systematic skill teaching and practice • Maturation stage variability • Past training experience variability • Unpredictability in development and later success	Identifying potential/talent in youngsters is problematic		
• Early selection/de-selection putting 'kids' off sport • Identification difficult—requires best coaches • Transitions can be positive or negative		Athlete development is individualized and unpredictable	
• Transitions offer important lessons	Transitions — issues regarding potential problem periods		
• Most athletes have hard times • Mental toughness key to progression • Pressures affect athletes differently • Support network important • Variety of potential generic and individualized problem periods			
• Development experience is required before potential can be identified	Identify potential over time	Flexible, open, and ongoing opportunities	Importance of ongoing TID and opportunities
• Potential emerges over time	Provide breadth and depth of opportunities		
• Late developers exist • Variations in progress exist • Sport-specific skills • Fundamental and generic skills	Wide range of necessary skills		
• Life skills • Love for the game		Skills that must be promoted in development environment	
• Ability to adapt to life, competition or training pressures	Generic qualities of young players with potential		
• Fundamental skills and coordination • Ability to improve and develop • Mental desire and attitude to improve/succeed • Individual differences in mixture of qualities characterizing potential			

APPENDIX 3

Related Publications and Funding

Peer Reviewed Publications

Martindale, R.J.J., Collins, D & Daubney, J. (2005). Talent development: a guide for practice and research within sport. *Quest*, **57**, 353-375.

Abraham, A., Collins, D., & Martindale, R.J.J (2006). The Coaching Schematic: Validation Through Expert Coach Consensus. *Journal of Sports Sciences*, **24**(6), 549-564.

Martindale, R.J.J., Collins, D., & Abraham, A. (2007). Effective talent development: The elite coach perspective within UK sport. *Journal of Applied Sports Psychology*, **19**(2), 187-206.

Martindale, R.J.J., Collins, D., & Keavenley, A. (Under Review). What's been good for me? An athletes' perspective on talent development. *International Journal of Sport and Exercise Psychology*

Martindale, R.J.J., Collins, D & Westbury, A. (Under Review). The development and validation of the talent development environment questionnaire (TDEQ). *Journal of Sport Sciences*

Conferences and Other Publications

Martindale, R. J. J., Abbott, A., & Collins, D. (2002) *A Theoretical Evaluation of Talent Identification Processes*. Proceedings of the 12th Commonwealth International Sport Conference. Manchester, July 19 – 23.

Abbott, A., Collins, D., & Martindale, R. J. J. (2002) *Talent Identification: How Not To Do It!! Current 'World Best' Practice?* Proceedings of the 12th Commonwealth International Sport Conference. Manchester, July 19 – 23.

Collins, D., Abbott, A., & Martindale, R. J. J. (2002) *Talent Identification And Development: How Would We Do It?* Proceedings of the 12th Commonwealth International Sport Conference. Manchester, July 19 – 23.

Jess, M., Fraser, G., Collins, D., Sowerby, K., & Martindale, R.J.J. (2002) *Establishing Educational Experiences For Talented Children In The Primary School: The Biddick Experience*. Proceedings of the 12th Commonwealth International Sport Conference. Manchester, July 19 – 23.

Abbott, A., Collins, D., Martindale, R. J. J., & Sowerby, K. (2002). *Talent Identification and Development: An Academic Review.* Sportscotland. ISBN 1 85060 418 5

Abbott, A., Collins, D., Sowerby, K. & Martindale, R. J. J. (2007). *Developing the Potential of Young People in Sport: A Report for Sportscotland by the University of Edinburgh.* Sportscotland, Edinburgh.

Technical Reports

Abbott, A., Collins, D., Martindale, R. J. J., & Sowerby, K. (2001) *Sport Interactive: A Baseline Report.* Sportscotland, Edinburgh.

Abbott, A., Collins, D., Martindale, R. J. J., & Sowerby, K. (2002) *Sport Interaction: Final Report.* Sportscotland, Edinburgh.

Abbott, A., Collins, D., Martindale, R. J. J., & Sowerby, K. (2003) *Developing The Potential Of Young People in Sport (DPYPS): A Baseline Report.* Sportscotland, Edinburgh.

Collins, D., Abraham, A., & Martindale, R. J. J. (2003) *Elite UK Coach Research Project.* UKSI, London.

Abbott, A., Collins, D., Sowerby, K. & Martindale, R. J. J. (2004) *Developing The Potential Of Young People in Sport (DPYPS): A Final Report*. Sportscotland, Edinburgh.

Martindale R.J.J., & Douglas, C (2008) *Player Development Review for PRL: A Final Report.* PB Performance.

Related Funding

Sportscotland

- Sport Interactive: June 2000 – December 2001 (£100K +)
- Developing the Potential of Young People in Sport: January 2002 – April 2004 (£100k +)
- Fundamental Resource Pack for Developing Talent: January 2007 – April 20008 (£2,796)

UK Sports Institute

- Coaching Research in the UK: Examining the Talent Development Environment: March 2002 – April 2003 (£15,000)

Premier Rugby Ltd

- Premier Rugby Academies - Assessment of Effective Practice: January 2007 – January 2008 (£10,000)

APPENDIX 4

Talent Development Environment Questionnaire (TDEQ)

TALENT DEVELOPMENT ENVIRONMENT QUESTIONNAIRE (TDEQ)

2008 Version

Instructions

Over the next few pages there are series of statements (68) which refer to you and your development in sport. Please indicate the extent to which you agree or disagree with each statement based on your current experiences. For example:

	Strongly Agree	Agree	Agree a little bit	Disagree a little bit	Disagree	Strongly Disagree	
1. Spectators regularly come to watch our games..... 1	☐	☐	☐	■	☐	☐	1
2. My coach often talks to me about how I can improve.....2	☐	■	☐	☐	☐	☐	2

There are no right or wrong answers. All answers will be kept confidential and nobody except for the researcher will see your personal responses. Any information disclosed will only be presented as a group average. This is to ensure you are comfortable about giving honest responses.

The questionnaire will take about 10 minutes to complete. Please do not dwell on questions. If you are not sure, go with your gut instinct. However, please try to answer questions as accurately as you can as this could help improve the standard of your development experiences.

After you have finished please check through your responses to make sure you have an answer for each question

Today's Date.....

Name of your Current Sport Academy
(or if not applicable your coach).....

Sport.....

Name.....

Date of Birth.....

Gender Male / Female

	Strongly Agree	Agree	Agree a little bit	Disagree a little bit	Disagree	Strongly Disagree	
1. My coaches care more about helping me to become a professional/top level performer, than they do about having a winning team/performer right now							1
2. I am being trained to be ready for almost anything that is thrown at me in sport and life							2
3. If I got injured I believe I would continue to receive a good standard of support							3
4. My school/college/university don't really support me with my sport when I need it							4
5. All the different aspects of my development are organised into a realistic timetable for me							5
6. It is unusual to get specific training to teach us how to make good decisions under pressure							6
7. Me and my sports mates are told how we can help each other develop further in the sport							7
8. I can pop in to see my coach or other support staff whenever I need to (e.g. physiotherapist, psychologist, strength trainer, nutritionist, lifestyle advisor etc)							8
9. I am rarely encouraged to plan for how I would deal with things that might go wrong							9
10. My coach is good at helping me to understand my strengths and weaknesses in my sport							10
11. Strength and conditioning training is specifically incorporated into my programme which is helping me get strong and fit for my sport (e.g. weight training, press ups, sit ups, body work, circuits etc)							11
12. My coach is good at helping me to understand what I am doing and why I am doing it							12
13. I struggle to get good quality competition experiences at the level I require							13
14. The advice my parents give me fits well with the advice I get from my coaches							14
15. My coach takes my whole life situation into account when planning my programme							15
16. My coach constantly reminds me what he/she expects of me							16
17. My coach doesn't often mention mental skills, such as imagery, positive thinking, coping with disappointment, competition routines, goal setting etc							17
18. My coach and I talk about what current and/or past world class performers did to be successful							18

	Strongly Agree	Agree	Agree a little bit	Disagree a little bit	Disagree	Strongly Disagree	
19. My coach doesn't appear to be that interested in my life outside of sport							19
20. The more experienced I get the more my coach encourages me to take responsibility for my own development and learning							20
21. My development plan incorporates a variety of physical preparation such as fitness, flexibility, agility, co-ordination, balance, strength training etc							21
22. If it didn't work out for me here, there are other good opportunities that would help me to keep progressing in my sport							22
23. My coach and I regularly talk about things I need to do to progress to the top level in my sport (e.g. training ethos, competition performances, physically, mentally, technically, tactically)							23
24. My coaches and those who support me give me straight answers to my questions							24
25. I don't often get any help from more experienced performers							25
26. Those who help me in my sport seem to be on the same wavelength as each other when it comes to what is best for me (e.g. coaches, physiotherapists, sport psychologists, strength trainers, nutritionists, lifestyle advisors etc)							26
27. Developing performers are often written off before they have had a chance to show their real potential							27
28. My coach and I often try to identify what my next big test will be before it happens							28
29. My training programmes are developed specifically to my needs							29
30. Currently, I have access to a variety of different types of professionals to help my sports development (e.g. physiotherapist, sport psychologist, strength trainer, nutritionist, lifestyle advisor etc)							30
31. The guidelines in my sport regarding what I need to do to progress are not very clear							31
32. I don't get much help to develop my mental toughness in sport effectively							32
33. My coach rarely takes the time to talk to other coaches who work with me							33
34. I have the opportunity to train with performers who are at a level I am aspiring to							34
35. My coach rarely talks to me about my well-being							35
36. Feedback I get from my coaches almost always relates directly to my goals							36

	Strongly Agree	Agree	Agree a little bit	Disagree a little bit	Disagree	Strongly Disagree	
37. Organisation is a high priority to those who develop my training programme	☐	☐	☐	☐	☐	☐	37
38. My coaches ensure that my school/uni/college understand about me and my training/ competitions	☐	☐	☐	☐	☐	☐	38
39. I am regularly told that winning and losing just now does not indicate how successful I will be in the future	☐	☐	☐	☐	☐	☐	39
40. My training sessions are normally beneficial and challenging	☐	☐	☐	☐	☐	☐	40
41. I get the impression that my parents get frustrated if I lose	☐	☐	☐	☐	☐	☐	41
42. I regularly set goals with my coach that are specific to my individual development	☐	☐	☐	☐	☐	☐	42
43. I am involved in most decisions about my sport development	☐	☐	☐	☐	☐	☐	43
44. My coaches make time to talk to my parents about me and what I am trying to achieve	☐	☐	☐	☐	☐	☐	44
45. My parents are there to support me in many different ways if I need it (e.g. talk to me, financial, travel, organisation, emotional)	☐	☐	☐	☐	☐	☐	45
46. I am encouraged to participate in other sports and/or cross train	☐	☐	☐	☐	☐	☐	46
47. I am not taught that much about how to balance training, competing and recovery	☐	☐	☐	☐	☐	☐	47
48. My coaches talk regularly to the other people who support me in my sport about what I am trying to achieve (e.g. physiotherapist, sport psychologist, nutritionist, strength & conditioning coach, life style advisor etc)	☐	☐	☐	☐	☐	☐	48
49. My coach plans training to incorporate a wide variety of useful skills and attributes, for example, techniques, physical attributes, tactical skills, mental skills, decision making	☐	☐	☐	☐	☐	☐	49
50. My coach actively develops my understanding of my sport development (e.g. technical, tactical, mental, physical, lifestyle, sport process)	☐	☐	☐	☐	☐	☐	50
51. I feel pressure from my mates in sport to do things differently from what my coaches are asking of me	☐	☐	☐	☐	☐	☐	51
52. My coach often talks to me about the connections/overlap between different aspects of my training (e.g. technical, tactical, physical & mental development)	☐	☐	☐	☐	☐	☐	52
53. I am constantly reminded that my personal dedication and desire to be successful will be the key to how good a performer I become	☐	☐	☐	☐	☐	☐	53
54. My coach emphasises the need for constant work on fundamental and basic skills	☐	☐	☐	☐	☐	☐	54

	Strongly Agree	Agree	Agree a little bit	Disagree a little bit	Disagree	Strongly Disagree	
55. There are people who help me/teach me how to deal positively with any nerves or worries that I experience (e.g. coaches, parents, psychologists)							55
56. My coach is a positive supporting influence on me							56
57. On the whole, my mates (inside and outside of sport) are a positive support network for me							57
58. My training is specifically designed to help me develop effectively in the long term							58
59. I spend most of my time developing skills and attributes that my coach tells me I will need if I am to compete successfully at the top/professional level							59
60. My coach explains how my training and competition programme work together to help me develop							60
61. My coach allows me to learn through making my own mistakes							61
62. My coaches and those that support me are good at helping me to develop genuine confidence in myself (e.g. coaches, parents, psychologists etc)							62
63. I am encouraged to keep perspective by balancing any frustrations I may have in one area by thinking about good progress in others (e.g. slow skill development but good strength gains or poor performances but good technical development)							63
64. I would be given good opportunities even if I experienced a dip in performance							64
65. My coaches and others who support me in sport are approachable (e.g. physiotherapist, sport psychologist, strength trainer, nutritionist, lifestyle advisor etc)							65
66. I often have the opportunity to talk about how more experienced performers have handled the challenges I face							66
67. My progress and personal performance is reviewed regularly on an individual basis							67
68. My coach emphasises that what I do in training and competition is far more important than winning							68