**Abstract**

This research aims to investigate an environment designed by a head coach with a track record of both highly successful talent development, and world class performance outcomes in the sport of triathlon. A qualitative approach involving semi-structured interviews with the Head Coach, the Psychologist and the Nutritionist was used. Key considerations regarding the selection of athletes were discussed providing evidence for the key role of psychology and prolonged trials that allowed thorough understanding of the athlete and insight into development capacity, as well as their contribution to the wider squad. In addition, a coaching team was embedded utilising a multidisciplinary approach, and significant others were actively incorporated in the development process. Furthermore, the complexities of managing long-term development were highlighted and the use of challenge as a mechanism of development was evident.

**Keywords:** High-performance elite environment, talent identification and development, triathlon, athlete selection, elite sport.

Introduction

Over recent years, research has increasingly focussed on the role of coaching in the development and performance of talented athletes across various sports and cultures. Coaching is a largely controllable factor that has been shown to contribute significantly to the progression and performance of athletes, and as such it plays a crucial role in both the management and development of talent (Martindale et al., 2005). Coaches are an integral part of every organisation’s High-Performance (HPE) and Talent Development Environments (TDE) and have a direct connection with, and influence over athletes (Henriksen, 2010a). HPEs represent the pinnacle of elite performance and results at this level are inevitably seen as the main marker of success of an organisation. These environments have also been shown to be characterised as dynamic, complex, and unpredictable (Purdy & Jones, 2011) and as such, understanding what type of coaching practices are used to achieve and sustain success at that level is of paramount importance. The pillars of coaching practices that can lead to success have been shown to be linked with the coaching philosophy, the vision, the people involved in the coaching team and the type of the environment (Lara-Bercial & Mallett, 2016). Research has also highlighted that the nature of coach behaviours, leadership skills, and quality of coach-athlete relationships can predict future success (Felton & Jowett, 2013). Understanding and investigating successful environments is one way through which knowledge can be gleaned to provide useful insights into the priorities, structures, strategies, and mechanisms that underpin such success.

Interestingly, within the literature talented athletes or “talent pathways” typically refer to programmes which are designed to identify and develop youth individuals to reach senior level (Webb et al., 2016). High performance environments on the other hand are concerned predominantly with environments that produce sustainable, high level performance outcomes at senior level (e.g., Jones et al., 2009). However, it is important to recognise that while in many cases, the talent development system could be considered distinct from the high-performance environment, perhaps sitting below, or around it as a feeder, many of the best high-performance environments are excellent at continuing to develop their talent over time, including already elite, world class talent. Indeed, many organisations known for consistent production of talent, do so partly because of the integration and overlap of their TDEs and HPEs. As such, identifying and investigating environments which both develop talent and produce success at the highest level will enhance our current understanding of the mechanisms underpinning effective coaching at this level.

There are numerous examples that provide evidence of this combination of performance and development outlining that in reality those two pillars can be integrated together into an environment. For instance, in football most teams have long-term goals related to their success (i.e., win a title, cup, secure a position for European competitions). However, alongside this goal there are others which are either short-term (i.e., winning a game on Sunday) or are relevant to the future further ahead (i.e., develop a young promising talent to be a big player in three seasons time). To achieve the combination of these goals, long-term development and short-term performance need to be working together as an integrated HP-TD environment. Similarly, teams preparing for the Olympic Games will have goals related to qualifying and winning medals. However, these goals necessarily incorporate a variety of short-term performance related goals (i.e., competing and possibly winning national/international competitions) and longer-term development goals (i.e., improving technique, adopting a new psychological strategy). These examples demonstrate the need for the integration of performance and development within an environment that aims to be successful and sustain success at the top level. As such, research focussed on both HPEs and TDEs may be pertinent to understand the requirements in this context.

Research to date has generally investigated these environments (HPEs vs TDEs) with a clear distinction, bar a few exceptions (e.g., Hall et al., 2019). For example, in the early 2000s, Martindale and colleagues recognised the need to examine the aims, methods and modus operandi of effective talent development coaches and pathways to understand how to best facilitate the progression of young talented athletes to senior world class status (e.g., Martindale et al 2005; 2007). This TDE focus has developed since through a range of in-depth qualitative case studies of different TDEs, highlighting the consistent albeit context specific nature of effective practice (e.g., Henriksen et al., 2010a, 2010b, 2011). There has also been a range of quantitative work focussed on understanding the relationships between the environment and important athlete outcomes (e.g., Cao et al., 2013). An additional and distinct body of literature has examined HPEs in sport, focussed specifically on the performance environments of world class athletes (Sotiriadou & De Bosscher, 2018). Initial interest in this area was developed by Jones et al. (2009) who developed a model which identified key features of the environment drawn from organisational literature. Similar to the TDE research focus, this model has subsequently been investigated and used as a springboard for further sport specific research over time (e.g., Hodge et al., 2014; Fletcher & Streeter, 2016).

**High Performance Environments**

With regards to HPEs, Jones et al. (2009) identified a gap in our understanding of the factors associated within a successful HPEs in a sporting context. They initially carried out a review of organisational and performance psychology literature to identify psychological and social factors associated with sustainable high performance at the individual, group and organisational levels. The four core components of the High-Performance Environment model (HPE) were shown to be leadership, performance enablers, people, and organisational culture. More specifically, leadership refers to the influence of an individual over a group of individuals working towards a common goal, performance enablers refer to the support from the environment, people are the individuals working within the environment, and finally organisation culture is the perception of the members of their organisation as a whole (Jones et al., 2009). A growing body of literature has attempted to test this model and enhance our understanding specifically related to HPEs. For instance, Hodge et al. (2014) examined the motivational climate of the New Zealand All Blacks rugby team while Fletcher and Streeter (2016) investigated the HPE in elite swimming.

In their investigation focused on the All-Blacks, Hodge et al. (2014) identified a number of key elements that were applied within this HPE. A key aspect of this HPE was the moto “Better People Make Better All Blacks” highlighting the nature of the autonomy-supportive coaching approach. More specifically, the motivational climate of the environment involved providing choices for the athletes, encouraging them to take initiative and used empowering performance feedback (focused on how to improve rather than how to reduce a weakness). Additionally, the leadership style was considered transformational, emphasising on the creation of a vision with the provision of support to achieve this vision combined with challenges to facilitate this process. The study by Fletcher and Streeter (2016) examining a HPE in swimming identified three key themes related to the leadership: vision, support, and challenge. Firstly, the vision was focused on self and collective improvement and there was a team ethos of shared leadership and ownership. A high level of support was evident particularly in relation to motivational feedback and management of disappointment. The challenges presented to the athletes had the form of intellectual stimulation and high-performance expectations.

Recently, Salcinovic et al. (2022) conducted a systematic review to explore the factors influencing team function and performance in HPEs. In their review, which included research from various industries, there were 8 studies included that focused solely on sport (You et al., 2020; Verma et al., 2012; Arnold et al., 2016; Carmichael & Thomas, 2000; Leo et al., 2013; Sanchez et al., 2007; Warner et al., 2012; Buran et al., 2019). The key findings from the studies focused on sports revealed that higher performing teams did have distinct environmental strengths such as highly aligned, and coherent goals coupled with the ability to adapt (You et al., 2020). They also had higher levels of group or structural cohesion (Leo et al., 2013; Verma et al., 2012; Warner et al., 2012), and effective communication, which appeared to be key for a successful working and collaboration within a multidisciplinary team (Buran et al., 2019).

**Talent Development Environments**

As alluded to earlier, in response to the recognition of a lack of explicit guidelines for setting up effective TDEs, Martindale and colleagues (2005, 2007, 2010) identified key features of effective practice through a triangulated method of investigation, including a systematic review of literature, interviews with a variety of highly renowned talent development coaches, and focus groups with a wide range of developing athletes across a variety of sports within a UK context. This investigation of the aims, methods, modus operandi, and philosophy of effective TDEs led to the generation of five overarching generic features including: long term aims and methods; wide ranging coherent messages and support; emphasis of appropriate development not early success; individualised and ongoing development; and integrated, holistic and systematic development process.

Subsequently, a number of research groups adopted a case study approach to understanding effective TD practice in more depth, across a variety of contexts. Some of the first work that adopted this method investigated three successful environments in Scandinavia: sailing, track and field, and kayaking (Henriksen and colleagues, 2010a; 2010b; 2011) and provided a template for other research to follow. In an attempt to collate our understanding of the similarities between the different environments across the research to date, Hauser et al. (2022) conducted a scoping review examining both the functional and dysfunctional features of TDEs. The features designed and driven by coaches within successful environments included a focus on long-term development, with strong and coherent organisational culture and effort (e.g., Larsen et al., 2020; Ryom et al., 2020); training groups with supportive relationships (e.g., Haukli et al., 2021; Henriksen et al., 2010b); proximal role models (Henriksen 2010a; 2010b; 2011); support of sporting goals by the wider environment (e.g., Hall et al., 2019; Ryom et al., 2020), support for the development of psychosocial skills (Rongen et al., 2021), and training that allows for diversification (Henriksen 2010a; 2010b; 2011). Interestingly, despite the differences in the nature of the sports, their structure, and their cultural context, effective TDEs almost always share several common underlying, albeit contextualised features.

**Summary and Research Objective**

It is clear from the research within HPEs and TDEs that much in known about effective practice within those domains. However, ongoing work is required. For example, the majority of studies to date involve environments that were embedded within ‘conventional’ systems. This means that they were under the official support of the national federations or were part of organised elite clubs, however researchers have suggested that not all talent development have the same type of resources to develop, deliver and their programmes. Indeed, research has also highlighted that administration and structures within sporting organisations is often associated with significant constraints and barriers for the coaches on the ground, as well as being a source of resource (e.g., English et al., 2018). There is scarcity of research examining how such resourcing or constraint may influence the development and management of talent (Till & Baker, 2020) or what might be the characteristics of systems operating outwith the norms of being overseen by a governing body. Something that is becoming more popular as a feature of talent development and management pathways. This study aims to investigate a successful environment without the support and constraints of a governing body pathway.

There is also a dearth of literature examining HPEs and/or TDEs within the sport of triathlon. This is important, given the importance of considering the context specific nature of development and performance environments. Furthermore, triathlon is also a sport marked by distinctive characteristics. With its combination of three distinct disciplines (swimming, cycling, running), rapid growth, unconventional elite development pathways (e.g., athletes competing in other sports prior to triathlon, athletes reaching elite level at a later stage of their careers), and athletes peaking at later ages, presents a unique context for enhancing our current understanding around development and success at adult level.

In summary, while the literature to date provides a good understanding of the principles of effective TDEs and HPEs, it is clear that more research is needed to explore successful sport development and performance environments, particularly within under-researched and distinctive sports, such as triathlon, and in independent contexts that are becoming more recognised as part of overall performance pathways. With a few exceptions, most research to date has explored either distinct TDEs or distinct HPEs, it would add value to understand contexts that have demonstrated success as both an HPE and TDE as an integrated environment. As such the aim of this study is to qualitatively examine an environment that has been designed by a head coach with a track record of developing talent and producing highly successful elite level triathletes at international level, within an integrated HP-TD environment.

Methods

Design

Following methodological approaches used in the literature to examine unique environments within sports, the current study was aligned (in terms of sampling) with studies that examined a very focused sample linked directly to the phenomenon under investigation (e.g., Hodge et al., 2014; Jones et al., 2003; Franck & Stambulova, 2020). More specifically, Hodge et al. (2014) and Franck and Stambulova (2020) examined two participants while Jones et al. (2003) focused solely on one coach. As such, taking into consideration existing literature we have followed a qualitative oriented pragmatic methodological approach focusing on an independent, multi-national, and triathlon HPE, which was driven by the head coach, and supported by a limited number of support staff. Pragmatism as a paradigm is based on the idea of selecting the best methods to examine issues in the real-world, allowing for the use of a variety of sources of knowledge or data to answer the research questions (Brierley, 2017). As such, our approach is built upon a fundamentally pragmatic perspective (Giacobbi et al., 2005) leading us to combine our applied experience with pertinent literature in attempt to trigger the development of practically meaningful and theoretically grounded knowledge in an important applied area. More specifically, pragmatism places emphasis on action and the meanings attributed to actions assuming that this is the elemental category of knowledge (Biesta & Burbules, 2003; Denzin, 2012). Knowledge is constructed by interactions between humans and their environments, a concept labeled in the literature as transactional realism (Biesta & Burbules, 2003). In pragmatism, the decision making, and choices related to the methodology are focused to allow researchers to reach the intended outcomes (Kaushik & Walsh, 2019; Morgan 2014). Additionally, pragmatists would argue that knowledge is explicitly linked with experience (Hildebrand, 2011). In line with previous studies focusing on specific environments instead of providing a snapshot at a fixed moment of time (i.e., Hodge et al., 2014), the current study examined how an environment that was designed by a head coach was developed over a long period of time.

## Participants

As the sample of specific environment investigations can revolve around a person, a programme, a project, a concept or an institution, purposive sampling was used (Chien, 1981). Usually, criteria may include age, years of experience, evidence of level of expertise and situation and environment (Thomas et al., 2015). To understand in depth the structure and mechanisms of the HPE it was necessary to ensure that the key personnel (N = 3 of a potential 4 at the time of interviews) involved in the design, development and running of the HPE were interviewed. This included the head coach and support staff (nutritionist and psychologist). To reduce the possibilities of the participants being recognised their nationalities are not disclosed. The average age of the participants was 46 years (± 4.9) and their experience working at the elite level in sport was on average 19 years (± 1.7). The athletes that participated in this environment were between the ages of 18 and 30. Due to the uniqueness of the environment no additional information can be given as the individual would be identifiable and as such nationalities or details explicitly related to each member of the coaching team or the head coach remain confidential.

**Procedure**

Ethical approval was gained for the study from the Research Ethics and Governance Committee before approaching potential participants. The first author sent a recruiting e-mail along with the information of the study to the potential participants. One of the authors introduced the head coach to the first author who then contacted them. Consequently, the head coach shared the details of the support staff. All the participants were informed that it was not compulsory to participate in the study and they would be able to withdraw from the study at any time. Consent was gained from every participant prior to their interview, and it was made clear that all data would be anonymised and remain confidential.

The researcher sent the main interview questions to the participants after their agreement to take part in this study. This technique was used to enable the participants to be familiar with the type of questions used in the interview (Martindale et al., 2007). The rationale behind this decision was based on the literature suggesting that when participants have more time to consider their responses; the data they will provide will be richer and denser (Burke & Miller, 2001). The time range of the interviews was between 78 and 92 minutes with an average length of approximately 86 minutes. All the interviews were recorded to allow the researcher to transcribe them verbatim and analyse them. However, further clarification and probing were used when required (Patton, 1990). Building rapport and comfort with the participants and using neutral language when probing for their responses (Backstrom & Hursch-Ceasar, 1981) was used to guide the researcher away from biasing the responses of the experts.

## Interview Guide

A semi-structured interview was developed, consisting of nine open-ended questions, carefully structured to generate open-ended responses (Patton, 1990). This approach was chosen to allow flexibility when exploring areas that may emerge during discussions with the participants (Rynne et al., 2010). For instance, examples of the questions included in the interview guide used to address the aims of the current study are the following: what is the process of identifying/selecting someone who has the potential to become elite? How does this change over time? What is the process of identifying/ selecting someone to your squad? What do you do to facilitate the development of athletes?

## Data analysis

Inductive thematic analysis was the method chosen for the analysis gathered from the interviews of experts of the current case study (Edwards et al., 2002). Following an inductive approach requires the researcher to identify themes which are closely related to the data (Patton, 1990). In more detail, the researcher used the following steps: read multiple times the interviews to become familiar with the data while also wrote initial ideas, generated initial codes, searched for themes, reviewed the themes, defined, and named those themes and finally produced the final report. Similarity inferences were also included in the inductive analysis. To complete this process researchers, need to conduct constant comparison and careful examination of the data emerging through the analysis using inductive reasoning (Patton, 1990). The comparison of the coded experiences led to the creation of clusters of similar experiences which were used for the development of the themes. Finally, the themes were compared to form the categories. The process described continued until all coded experiences were included in themes and themes were distributed into different categories.

## Ensuring Quality

According to pragmatists there are some guiding principles that can be followed to enhance the validity of research (e.g**.,** Lincoln & Guba, 2000). More specifically, Whaley (2001) suggested that researchers adopting a pragmatic approach need to reflect about their research questions, the nature of their sample, and the implications of their findings for diverse groups of individuals. To ensure the trustworthiness of results Lincoln and Guba (1985) strategies have described the following four strategies:credibility, transferability, dependability, and confirmability, Credibility measures the truth value of qualitative research and the accuracy of the findings. Credibility relies on the researchers themselves and the methods followed. To enhance the credibility of the results it has been suggested that peer debriefing of the data in qualitative research is a strategy that can establish trustworthiness of the findings (Lincoln & Guba, 1985). In addition, Shenton (2004) has suggested that regular debriefing sessions should be used to reduce the personal bias of the researcher. Following the guidelines from literature regarding debriefing, the main researcher and another impartial expert in the field conducted extensive discussion regarding the findings and progress of the study (Lincoln & Guba, 1985). This reflective process allowed the researcher to understand how his personal perspectives and values may affect the findings, remove any assumptions made, and further discuss points that were under or over emphasised. This led to the enhancement of the quality of the results by increasing interviewer self-reflection and strengthening the confidence in the data collected (Emerson et al., 2011). To enhance the transferability of findings, researchers need to provide a clear overview of the contextual information of the research particularly about the environment, participants, and procedures to enable readers to assess the transferability of findings (Lincoln & Guba, 1985). Moreover, in terms of the dependability, guidelines suggest that researchers need to describe clearly and in detail the processes followed within the study allowing futures researchers to repeat the study in the future. Finally, to ensure the confirmability of the findings of the current study the method of triangulation through multiple analysts was followed. Having two or more researchers analysing independently the same qualitative data and then comparing their findings reduces the potential bias that comes from a single researcher (Patton, 2002).

# **Findings**

The first part of the findings section contains a descriptive presentation of the environment to allow the reader to understand some of the key characteristics of the environment under investigation. Additionally, the main themes identified by the inductive thematic analysis were the following: a) considerations for athlete selection, and b) processes in athlete development and summarised in table 1 outlining the main findings of the qualitative analysis and providing a map for the readers to navigate through the results.

INSERT TABLE 1 ABOUT HERE

**Characteristics of the Triathlon HPE**

The uniqueness of the environment was the key element that led the researchers to undertake this research and attempt to unearth the operating mechanisms of this case study. Firstly, this triathlon environment can be described as ‘highly successful’ and therefore appropriate for conducting a case study to expand our current understanding of effective environments and coaching practice. First, in relation to performance outcomes over the time span of two Olympic cycles, the environment produced multiple (>10) European, World, and Olympic medalists. Second, in relation to development over the same timescale, the environment consistently facilitated athletes achieving a top 5 finish at the highest competitive level for the first time in their careers. This provides evidence that the environment under investigation was not only operating at high performance level but also developed athletes to ‘get’ to that level if this was required. Finally, the environment was identified and recognised publicly within the triathlon community and beyond as one of the best triathlon environments in the world at the time of the study. Additionally, this environment was independent and unconstrained by external bodies. Particularly the head coach, who was the architect of this environment, was highly intrinsically driven to be world-class, and to help the athletes be the best they could be.

The coach had a vast range of experience working at elite level in different roles and sports (more specifically fifteen different sports including boxing, wrestling, and target sports such as archery and endurance sports like triathlon or running). During their career, they also worked as coach and head coach in a variety of triathlon environments at both elite and development levels, across a range of nations that allowed them to further improve their coaching skills by deliberately working in challenging environments. The coach worked in collaboration with a nutritionist, physiotherapist, massage therapist and psychologist using an interdisciplinary approach. The massage therapist was usually full-time, the physiotherapist was full time for key periods of the Olympic cycles, while the psychologist and nutritionist worked part-time. These part-time roles comprise of providing support from distance, in combination with time spent face to face at training camps, races and major Games.

The support staff members work closely with the coach and each other, espousing an interdisciplinary approach. In fact, due to the part-time nature of some of the coaching team, much of the impact they had was likely to be ‘through the coach'. In addition to this, each member had certain individual responsibilities typical of those roles. For example, the psychologist had a remit to develop and introduce psychological skills and education to the athletes where appropriate. While the nutritionist educates the athletes regarding weight management and helps them optimise performance based on what and how much they drink and eat. Significant efforts were made to ensure that the key messages and aims of the team were coherently linked together. Therefore, support staff members were conscious to ensure that the work they do fitted well with the messages that were being given by the coach and other members of staff. This ensured the coherency of the environment, messages, goals, and expectations from the athletes. Not only do the support staff members work in close collaboration with the coach but they also support the coach to maximise their ability to function well. For instance, the role of the psychologist would include helping the coach to manage themselves and function effectively despite pressure or any other stressors and challenges that may exist. Additionally, the staff offered support to the athletes from a confidential and often remote position. For example, this may be particularly important in relation to weight management from a nutritionist perspective because it can be an emotional journey for athletes (especially females), which may create tension to the coach-athlete relationship. All these efforts are in line with the plan designed by the coach and reinforce the existing goals and expectations.

## Considerations for Athlete Selection

***Motivation – A Key Characteristic for Initial Selection***

The coach was looking for individuals who were extremely motivated to achieve excellence, coupled with an indication of physical potential. Consequently, athletes who were selected for this coaching environment often had some kind of motivational background story. For example, they may had been dismissed or overlooked by their federations or other coaches, or some other situation that means they were extremely committed and driven to succeed – almost desperate.

…I always got the people who were a little bit difficult or didn't quite fit in. But also, I got people who moved country to be with me. They would leave their family for me, sometimes I have a wife with a husband at home, she would come, she would leave home for nine months a year. So, I had athletes that were very motivated.

Head Coach

…this huge drive to the best or to achieve something very special, so they have to be extremely driven, because the things they have got to commit take a long, long time and huge commitment of being away from home and going through difficult times, going through injuries and going through disappointments and all that sort of stuff, they have got to really, really want it.

Psychologist

The motivation and drive to succeed had to be coupled with the ability to work hard consistently, do simple things well without overthinking, and make the most of the learning opportunities. Those attributes were considered to be essential requirements, and as such, the coach used those characteristics for selection criteria to the squad.

…it is about the work that you do every single day. It is about how relentless you are. So, the first thing that I see about the good athletes is that they drive themselves.

Head Coach

I think it is much more about doing simple things, very well, very consistently over a long period of time.

Psychologist

In addition, the coach spoke with the partner/significant others of the athlete(s) willing to join the squad in order to identify whether the significant others (i.e., the ‘team’) were also committed to supporting their effort. The commitment and support of significant others was also essential for the effective development of the athletes within the environment. As such, this step was integral in the selection process of the potential athletes.

If the person is married for example, he will have the husband sit in on the interview, or the wife sit in on the interview, that sort of stuff, so it is kind of an ‘is this a team approach? Are you both committed to this?’

Nutritionist

***Capacity To Act as a Role Model and Add Value to the Culture of Collaborative Learning***

Another essential criterion for selection was both the character and abilities of the individuals, to enable those athletes to ‘add value’ to the squad. The coach was very thorough while selecting athletes for the environment to ensure that the athletes would be able to influence each other and create a natural collaborative learning process, creating a culture of excellence, healthy competition, openness to learning and role modelling within the environment. For example, someone might have been a very good swimmer so they would challenge the rest to become better. Additionally, they may select someone based on their personality if they believed that this would improve the environment of the squad. The balance of the group was of vital importance therefore when selecting, the coach assessed the personality of the athletes and took into consideration the potential risks and benefits for the whole group. This culture of role modelling helped ensure that all athletes were treated equally, respected and acknowledged for their contribution. There was no hierarchy, that may be common in other systems.

The Coach is fairly careful in how they select people to come into the programme. So, make sure there is a balance, there is no one person who is dominant.

Nutritionist

It might be that someone is a really, really good swimmer even though they are not world class at everything, they will help the others lift that aspect. Or it might be that the Coach brings people in that they think will add value because of their personality, they will add value to the squad environment.

Psychologist

I was quite tough about who I picked, and I was very interested because in a squad you can’t have any premier athletes, so I treat everyone the same. It is not a hierarchical system. So I am the same as the lowest athlete or the highest athlete, it doesn’t matter.

Head Coach

***Multifaceted, Thorough Selection Process***

To further assure the balance of the squad, the coach conducted a detailed interview with the prospective athlete including a psychological profile. This allowed the coach to have an understanding of the character of the prospective athlete and identify whether they would fit in the squad without ruining the balance. Moreover, the coach would ask and value the opinion of the rest of the athletes before deciding whether to give a prolonged trial period to the prospective athlete.

The Coach will always do a detailed interview with them, either by Skype or face to face. Then almost always will do the psychological profile as well. Then the Coach will usually ask the rest of the group what they think.

Nutritionist

Additionally, athletes would be invited for trials in training camps, which gave a chance to the coach to review their input and decide whether they would fit well and add value to the team. This was the last step of the selection process demonstrating the depth of the process while also providing time for the prospective athletes to experience the environment before becoming members. When the trials were positive the coach would give athletes a block of time (e.g., six months) for identification and selection.

They might get an opportunity to test the water, at a camp or something and then they can come in and the Coach might say ‘ok, let’s get you in six months’ and then give them a block of time and the identification, selection, is ongoing.

Psychologist

## Processes in Athlete Development

***Thorough Approach to Knowing and Understanding the Athletes***

The Head Coach followed the triathlon world closely and had in depth knowledge regarding the performances and abilities of all the current athletes. The coach would also speak with previous coaches of athletes. Useful information with regards to weaknesses, strengths and needs of each athlete could be obtained through this process as well. Therefore, even before an athlete approached the coach, they were already aware of the performances, previous training plan, strengths, and weaknesses. This knowledge of the developmental history and the current/previous performances provided a ‘map’ for the coaching team and allowed them to help athletes early on from a well-informed position.

The Coach has got a strong knowledge of the sport if you like, there are not many people they are not aware of in terms of who is progressing, they have lots of contacts in all the countries and in junior ranks and obviously the world cup level they will know who is there, if you like, they will know who has got funding, who is working with which coaches and who gets dropped from funding.

Psychologist

Another aspect of the selection and early development process is that the coach would dedicate time to try to understand the athletes as much as possible. For example, athletes may be encouraged to stay in the staff accommodation (partly to help with expenses, as it would be free of charge) but importantly to spend time with the athletes to get to know them better. This allows the coach to understand the athletes; their habits, their coping skills, and their needs to create their development plan accordingly. As such, allowing time for the development of the athletes was a cornerstone of the approach starting by giving time to ‘get to know’ the athletes during their first period in the environment.

So generally, when we have got a new athlete in the programme, we have a period of time where they live with us, so we can assess, both of us can assess what their coping skills are, how good they are at looking after themselves…

Nutritionist

The identification and selection are integrated within the development and ultimately it is very difficult I think to pick out potential without seeing someone over a period of time and seeing them under pressure in different types of situations.

Psychologist

***Recognition and Management of Idiosyncratic Development Rates***

Participants reported that the progression rates of the athletes vary enormously depending on multiple factors, some of which may be hard to understand. However, specifically within the HPE under investigation the ability of athletes to trust the process, build a strong relationship with the coach and commit themselves to the mental and physical challenges were often the ones who progressed at faster rates. It needs to be taken into consideration that the key goal of the development of this HPE was the Olympic Games and as such the development was based around this longer-term aim. More importantly though, the Head Coach understood that individuals develop at different rates since the development is idiosyncratic, and this was at the centre of the whole environment navigating the approach of the coaching team.

They progress quite differently sometimes. So, some people can come to the squad and progress very rapidly and other people take time and just have a very slow progression or a very gradual progression so there is quite a bit of variety in terms of the progression rates. I would say that part of the progression rates probably does depend on how capable the athlete is to take on board the type of environment that they suddenly find themselves in.

Psychologist

The coach and support staff espoused that the development of talent is a long-term project. As such, the coach would give several opportunities to the athletes to prove that they can develop and progress. If they failed to do so quickly, the coach would guide them, challenge them, and give them a number of opportunities in order to assess how they respond and how they progress. If they failed to meet the head coach's expectations after a more prolonged period (up to 18 months) after opportunities for change were given, then the coach would ask the athlete to leave. As such, this process was essentially part of the identification and selection of athletes since if they didn’t manage to fit into the squad, athletes would not have had the opportunity to develop within this HPE over a long period of time. If an athlete didn’t eventually meet the expectations, they would be de-selected from the HPE without having an opportunity to be a part of the preparation of the following Olympic cycle.

I would say they would give people 18 months-two years, so they wouldn't say ‘you are not producing, you have not changed in four months, you are out'. They would say ‘it takes time', or if there was an issue of some sort impacting on others they would tend to keep an athlete for a period of time, and watch them under the challenge of racing, under the challenge of the environment that they are in, see how they progress and they would be pushing buttons trying to get them to change, and develop, if they just really, really didn't change and the Coach didn't see any future then they would ask them to leave.

Psychologist

The need for a nurturing developmental period of apprenticeship was of paramount importance especially for the young talented athletes who wanted to step up and compete at senior elite level. As such, time for development was essential and as such it might be essential for athletes to participate in less prestigious races to gain experience competing against experienced athletes. Triathletes seeking immediate success were likely to get frustrated as World Series events were increasingly demanding and competitive, and at the same time with reduced financial rewards. The coach had realistic expectations and most importantly, the coach prioritised the long-term development goals of the athletes over immediate results.

I think you have got to know that you are not always going to be the best athlete, and you need to be prepared to put in time, it is almost like an apprenticeship, you have to be prepared to put your apprenticeship hours in, it is going to take three or four years where you have some very disappointing results, you might have a couple of good ones just to keep you going. So, you are just faced all the time with this disappointment of not being successful against your peers. But your peers that you are comparing yourself against are very experienced…

Nutritionist

On the other hand, examples were given highlighting the negative consequences of talented athletes being pushed to compete too soon by federations, instead of being given the time to fully develop before racing at elite senior level. If athletes compete too early at elite senior level, with high expectations of success, it is likely that they will fail and consequently cope poorly.

…having worked across a number of federations now, basically the federation put athletes up on a pedestal and treat them as the next new miracle that is going to come into the sport, which puts a lot of pressure on at a very early age, when they are not psychologically prepared to deal with that, and to deal with the fact that they are not going to be the best of the best when they get into that senior elite level.

Nutritionist

***Challenges: A Mechanism for Development***

One of the main characteristics of the environment examined in this HPE was its challenging nature. First and foremost, the Head Coach would constantly challenge themselves and the operations of the environment. This was demonstrated through regular reflection and internal discussions, and by connecting with, and bringing in specialist experts and outside coaches into the squad environment for short periods of time. Other experts were invited to training camps to provide up to date training methods or knowledge to the athletes and the coach. The coach was highly motivated to stay up to date on research developments to identify novel ways to help the athletes as much as possible. The head coach also had a history of challenging themselves as a practitioner and triathlon coach. Challenge was used as a key mechanism for development by the Head Coach firstly in relation to their own practice and the operation of the squad, and subsequently about the coaching team and the athletes of the environment.

I wanted to find out if I was any good. So, I really picked the worst place to develop triathletes. I feel as if my [small nation] experience was like deliberate practice. I picked somewhere that was going to be difficult…. And in the end, many of them became very, very good. All ten of these athletes had careers, real careers. Everyone got onto a podium at an international race.

Head Coach

The coach is always talking to the expert in the field of the latest technique or strategy or technology or whatever, they might bring them in to talk to people or they might take them to camp, or they might go and see them or speak to them and come back and tell everyone.

Psychologist

According to the participants, challenge was an integral part of the development process towards excellence. Therefore, the coach intentionally either let athletes face certain physical or mental challenges or created some for them intentionally. This often created a tough-love relationship between the coach and some of the athletes, but was used to get the most out of the athletes and help them reach their best potential.

… sometimes the Coach has to make a call as to whether that is the most important thing for their well-being versus whether they just need to suck it up and deal with it. That is sometimes a very fine line. Their job is to keep pushing their buttons to get them to where they need to be. And it is not an easy path.

Nutritionist

It is inevitable that all athletes will face many challenges throughout their careers. Therefore, to be successful athletes need to have or develop the ability to deal with those challenges. As such, the first step of the philosophy around the implementation of challenge was to ensure that athletes would have the capacity to handle challenges. Many challenges occurred such as injuries or being away from home, underperforming, not developing as fast as expected, not receiving funding, or having feelings of burnout etc. In further support of this concept the Head Coach hence characterised the ability to handle challenges well, or build successfully through challenges, as a fundamental quality to develop and achieve success within the environment.

The biggest thing I could point to would be their psychological capacity to develop through challenge and through the experience that they are getting while constantly learning and developing.

Head Coach

There was a strong belief that through challenge athletes would develop the necessary skills that would help them progress. For instance, the coach sometimes decided for instance to select two athletes to share the same accommodation to challenge them to develop certain characteristics. This could include a psychological behaviour or a change of a habit such as sleeping late. On other occasions, the Coach may let people struggle with something instead of offering them advice because they wanted to test their limits and see if they could learn to deal with difficulties. Based on his philosophy, skills can be learned through challenge, although the key is how the athletes respond to challenge.

The coach can implement and facilitate challenge by organising things or by going ‘right, we are going to race you in this competition because we want to learn this’. That is a challenge in training to do something different or something extra or something you think is beyond you.

Psychologist

Maybe the coach is putting them with a certain person because they think they are going to learn from each other and that is why they are not getting on. This person is like this, and they are like that. And actually, the coach wants athlete 1 to be a bit more like athlete 2 and athlete 2 to be more like athlete 1 so he puts them together.

Psychologist

Whilst challenge, either natural or intentional was a fundamental development tool in this environment, openness to this type of environment is an essential attribute for athletes who want to be members of this squad and get the most out themselves. The resilience was built through the training, racing and challenges, and skills were developed throughout the pathway. As such, athletes also needed to be willing to learn and change and engage with this process.

So, part of that comes down to an openness to want to challenge themselves, but also that you have got the skills to cope with that. So the right sort of coping skills, but those things you can learn and a lot of people I have seen don’t necessarily come in being able to cope with stuff, and through experience and through the training and the racing, they develop that resilience or those skills…

Head Coach

Interestingly, the coach identified that too much challenge could be linked with the fact that some of his athletes left as soon as they became successful. As such, excessive challenge could be problematic, for example, through certain key transitions such as the progression to world-class elite. The coach highlighted that the process of ‘getting there’ is different to what is needed to ‘stay’ at a world-class level. The development process towards world-class level is hard and constantly challenging for the athletes but to stay at such a high level, it is possible that a different or more flexible approach was needed. As the coach stated the success rate of this environments was very high in developing athletes to become successful at world-class level, however a number of athletes left when they reached that level. The coach reflected about the required nature of challenge and its impact on longevity of athletes within the sport.

If you look at my record, my record shows that I developed a lot of good athletes within the top five or ten in the world. But in recent years, as soon as they get there, they leave. Because the journey is not very much fun.

Head Coach

But if I look back, I probably made it too hard. Have I been successful, have I produced athletes? What about if I have made it so hard to produce the athlete, that by the end they want to leave? Is that success? I think I have probably been a little bit too hard.

Head Coach

Discussion

The aim of the current research was to qualitatively examine an environment that has been designed by a head coach with a track record of developing talent and producing highly successful elite level triathletes at international level, within an integrated HP-TD environment. The findings revealed the two key features of the environment related to talent selection criteria and associated process, and development processes.

As highlighted in the results section, high level of motivation was one of the key characteristics for initial selection for this environment. This finding somewhat anticipated as literature has demonstrated that motivation has been linked with dealing successfully with career transitions (Andronikos et al., 2021); and eventually reaching elite level in sport (Rees et al., 2016). As such, it not surprising that motivation was one of the key pillars that the Head Coach of this environment was looking for during the identification and selection process. In addition to this, interpersonal skills such as commitment, eagerness to learn, coping with challenges, and resilience were recognised in the current study supporting previous findings that had demonstrated the importance of such characteristics (Flatgård et al., 2020; Storm et al., 2021). Interestingly, a finding that was novel was the fact that during the selection process the significant others/partners were invited to a discussion to evaluate whether they would also be committed to this process as the Head Coach considered this as a ‘team’ effort. This is a finding that could have implications in other environments and could be applied in other selection processes. However, the flip side of this innovative approach is that this strategy could be perceived as overreaching as it could be argued that significant others do not need to be subjected to this evaluation. This is perhaps a judgment for each individual coach and environment to consider.

Further findings from the current study particularly focused on the selection strategies used in this environment provided significant contribution to our current knowledge in the area identification and development. In a recent systematic review Johnston et al., (2018) discussed the key characteristics of talent identification in sport outlining that the majority of the variables used in sport were anthropometric, physiological or performance related. On the contrary, the current study provides an original perspective into selecting athletes since the strategies employed included consideration of the group dynamics and balance of the training group while examining ‘how’ or ‘what’ value can each individual add to the environment through role modelling and collaborative learning. Role models (e.g. Henriksen 2010a, 2010b, 2011; Mills et al., 2014) and healthy competition complementing development (Haukli et al., 2021) are concepts that have been discussed in studies examining elite TDEs. As such, it appears that role modelling coupled with careful management of the composition of the group were key elements of the success of the environment under investigation.

The idea of role modelling and carefully considering the balance of the environment was complemented by allowing time for development which was at the centre of this environment. The idiosyncratic nature of development was recognised and formed part of the long-term development plan for each individual. Even though athletes were adults, and already performing at an elite or sub-elite level, the importance of providing time and opportunities to grow rather than focusing solely on results was highlighted. This finding demonstrates that despite that the environment was clearly performance-oriented and aimed towards success at world-class level, giving time for development was necessary as performance and development need to be integrated. The environment of the current study provided and ensured that athletes completed an ‘apprenticeship’ avoiding the common error of pushing athletes too much too soon. The idea of long-term focus rather than results was firstly introduced in the literature by Bloom (1985) however since then numerous studies have shown this is being adopted. For example, many elite football academy environments adopt a long-term focus such as Ajax (Larsen et al., 2020) and Genk (Ryom et al., 2020). As such, the selection of athletes was closely linked with the overall philosophy for development providing evidence that selection and development were ongoing and interrelated. To further aid towards this idea of allowing time for development the coaching team of the environment were promoting coherency of aims and messages.

Challenges were a key aspect of the development of the athletes and were used as opportunities to help athletes develop the desired characteristics or qualities that were believed to be necessary for stepping up to higher levels of competition. It is important to note that a key feature of the environment was that the coach and support staff made significant efforts to get to know and understand each of the athletes very well. This is the backdrop upon which individualised challenge was developed. Indeed, in many cases, those challenges were intentional structured challenges designed to facilitate the development of certain skills or attributes. A theory suggesting that challenge can play a beneficial role in talent development was introduced by Collins and MacNamara (2012) and since then has gained increasing attention. More recent studies have suggested that environments need to provide athletes with opportunities but also ensure that athletes do have the basic skills and attitudes to ‘bring in’ to the challenges they face (Collins et al., 2016). The current study gave evidence of how a continuously challenging environment can help athletes progress effectively and be successful supporting the practical applications outlined in recent studies within a football context (Flatgård et al., 2020; Larsen et al., 2020).

Nonetheless, it needs to be noted that the risks of introducing ‘too much challenge’ were described by the head coach outlining the importance of finding a balance between support and challenge to promote effective development and avoid dropout (Andronikos et al., 2019, 2021). Another potential risk of such an approach is linked with the psychological wellbeing of athletes in elite sport. High-performance environments because of their nature tend to focus on performance outcomes. This approach may impact the mental health wellbeing of both athletes and staff members. As such, HPEs need to be examined in depth in relation to their influence on mental health since there is growing evidence suggesting that they can increase the risk for developing mental health issues (Harvey et al., 2017). The process of developing athletes both physically and mentally may lead coaches to adopt behaviours which can be potentially harmful for athletes (Kerr & Stirling 2017). Additionally, research suggests that a controlling and unsupportive environment has been shown to cause more conflicts between athletes and their coaches (Wachsmuth et al., 2017). It is critical though to distinguish constructive challenges from potentially harmful behaviours and consequences. Evidence has highlighted the beneficial role of challenges when carefully implemented. Importantly, challenges should be individualised rather than adopting a ‘one size fits all’ approach as individual needs and preferences should be taken into careful consideration (Taylor et al., 2022; Martindale et al., 2023). Therefore, it is important to identify ways of fostering positive coach-athlete relationships and adopting an athlete welfare approach to talent development that can promote wellbeing and as a result may contribute to athletic performance as well (Smittick et al., 2019).

As an example of this, it has been recommended that to create high quality coach-athlete relationships and a supportive environment, coaches could follow the evidence-based strategies outlined in the COMPASS model (Rhind et al., 2012). This model includes the following strategies: Conflict management - e.g. clear expectations, Openness - e.g. honest discussions, Motivation - e.g. display the necessary skills and qualities to help athletes, Positivity - e.g. fairness, ability to deal with pressure, Assurance - e.g. providing opinions and feedback in a positive way, Support - e.g. demonstrating support and commitment to the relationship, Social networks - e.g. socialising outside the athletic environment. The strategies included in the model could alleviate the risks facilitating the development of athletes through challenges.

This study added a significant contribution to the current knowledge of an integrated HP-TD environment outlining the key aspects of the selection and development process. More specifically, the environment identified and selected athletes with a greater emphasis on psychology, allowed time for development, utilised role models, and implemented intentional structured challenges. Even though this study focused on a triathlon environment, within a unique context, there are some strategies and philosophies (e.g., long trial periods, assessment of motivation and evaluation of personalities in relation to the rest of the members of the group) that seem to have the potential for application in other sports or be adopted by national federations. In the current study, it is hoped that enough context has been provided to allow readers to glean useful information where it is deemed relevant to their environment or context (e.g., transferability). Future research needs to examine more HPEs with successful track record across different sports and contexts longitudinally, as well as consider the perspective of other stakeholders, and the wellbeing of athletes within those environments.

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# **Tables**

Table 1 Characteristics and structure of the triathlon HP-TD environment

|  |  |  |
| --- | --- | --- |
| **Main Theme** | **Subtheme 1** | **Subtheme 2** |
| Considerations for athlete selection | Motivation – A key characteristic for initial selection | Highly motivated, with physical potential  Capable of working hard consistently  Broader support and commitment to pursuing excellence |
| Capacity to act as a role model and add value to the culture of collaborative learning | Performance, development and/or personality related contributing factors  Collaborative learning environment  No hierarchy, equal treatment and respect |
| Multifaceted, thorough selection process | Psychological profile and interview  Other athlete opinions  Assessment of athlete’s attributes throughout trial period |
| Processes in athlete development | Thorough approach to knowing and understanding the athletes | Good prior knowledge of the sport and the athletes’ developmental and performance history  Providing a period of time specifically to get to know the athletes |
| Recognition and management of idiosyncratic development rates | Allowing time for development and the need for an ‘apprenticeship  Management of expectations  Avoiding a common error of pushing athletes too much too early |
| Challenges: A mechanism for development | Challenge as a core element of the environment’s philosophy  Use of intentional challenges, athlete attitude, coping skills and response  Management of intentional challenge: potential risks |