An Exploration of Coaching Practice: How do High-Level Adventure Sports Coaches Develop Independence in Learners?

Abstract

An increasing body of evidence has demonstrated that high-level adventure sports coaches are developing their learners towards a personalised conception of independence in their activities. However, how coaches do this has yet to receive much attention. This investigation draws on a thematic analysis of ten semi-structured interviews that followed coaching sessions with an explicit focus on developing independence. Three themes emerged: developing a cognitive performer; an attuned coaching process that fosters independence; and developing the individual's capacity to learn.

The findings suggest that learners have an explicit comprehension of the 'what and why' of the performance and coaches develop the learner's ability to learn both how and where to continue their development post-coaching. The coaches achieve these two objectives by developing a long-term independent performance in their coaching practice. Coaches are not trying to develop fully independent performances during coaching, but instead to prepare learners to continue their development with adaptable performances within the practicalities of learning in adventurous environments.

Keywords: comprehension of performance; developing independence; heutagogy; thematic analysis

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High-level adventure sports coaches have an explicit desire to teach for independence (Christian et al., 2017; Collins et al., 2015). However, there is no clarity of what is meant by independence in this context nor how it might be developed. This desire is against the backdrop of a rise in participation in adventure sports in the UK over the last five years. Sport England (2020) reports that, in 2019, 3.4 million adults took part in an adventure sport twice in the 28 days before the survey. The Office of National Statistics reports that the adventure sports sector contributed £1.8 billion to the UK economy in 2019 (Davies & Dutton, 2021), a contribution that has been rising since 2011. Unsurprisingly, there is an academic and market interest in investigating and reporting on adventure sports coaching practice. Specifically, Eastabrook and Collins (2020) report that an important part of the coaching experience learners seeks is to develop their independence and ability to undertake their own adventure. Given the differences in how independence may be interpreted by individuals, climbing for example can be a competitive, action or adventure sport depending on a participant's motivation or as a requirement of challenge and performance. This aspect of coaching practice is not well understood (Collins and Brymer 2020). Therefore, we seek to investigate how independence is perceived and developed by the coach of adventure sports

Consequently, we aim to identify the coach's role in developing adventure independence and to inform adventure sports coach development by providing insight into this complex task. This study reports the findings from a group of high-level adventure sports coaches whose stated aim is to develop performer independence. A reflexive thematic analysis was conducted on the transcripts of ten semi-structured interviews following observed adventure sports coaching sessions by those coaches.

Review of Relevant Literature

To provide suitable context and background, a brief review of the literature is offered in two sections: first, the nature of independence in adventure and second, an overview of adventure sports coaching practice.

The Nature of Independence in Adventure

Increasingly, the authors view adventure as a personalised construction that accommodates several key factors; a connection to wild environments, a social engagement and a challenge (Collins & Brymer, 2020; Ewert et al., 2013; Sugerman, 2001; Varley & Semple, 2015). Each individual places a different emphasis on these elements to satisfy their own motivation. As a consequence, the learners may have different expectations from the coaching relationship with their coach. For example, a group may seek low levels of challenge to permit greater socialising during a sea kayaking trip while others might seek the aid of manmade protection (bolts) to increase their level of challenge while climbing. Eastabrook & Collins (2020) found independence to be a small but important aspect of what learners sought from their coaching experience because of a link to confidence. Independence did not necessarily mean independence from the coach. Independence may be in the activity with an expert alongside providing a margin of security, for others it may mean learning a set of skills to enable the person to journey on their own in a remote setting, to undertake their own expedition. Independence appears linked to adventure and is also an aspect of a personal construct of adventure.

The desire to develop independence is not unique to adventure sports. Indeed, many sporting performances require an athlete to independently recall and execute a skill (Carson & Collins, 2011). However, in adventure sports independence appears to mean a

great deal more. This may be due in part to the naturally hyper-dynamic environment of adventure sports with its inherent risk. (Christian et al., 2020; Collins & Collins, 2016). A combination of the dynamic environment, personalised constructs for adventure and independence means that no situation is duplicated, and performance has to be highly adaptable and flexible as a response to the changing situational demands. This contrasts with sports that take place in manufactured or managed environments in which the dynamic aspect aspects of the environment are reduced often towards external regulation to ensure a literal and figurative level playing field (Collins and Carson 2021).

Reflecting the need for adaptability, many authors have reported significant cognitive effort associated with adventure sports experiences (Collins & Brymer, 2020; Ellmer & Rynne, 2016; Frühauf et al., 2017; Jones et al., 2017). The complexity and uniqueness of the environment for each performance are both cognitive and physically demanding. These authors characterised these demands as emanating from the need to learn from experiences, the ability to manage the demands of decision-making, developing a comprehension of their environment via a high level of situational awareness, and maintaining and developing confidence. Therefore, it seems logical that these cognitive or meta-cognitive aspects be considered part of independence in adventure sports.

Adventure Sports Coaching Practice

Adventure sports coaches have been reported as individualising their teaching to align with their learners' notions of adventure (Eastabrook & Collins, 2021), this incorporates independence. Logically then, effective coaching will also need the coach to understand the individual's conceptualisation of independence. In short, what kind of independence the learner wants while being coached and also post-coaching if any. These

situational demands frame the coach's decision-making around the session at the micro-, meso- and macro- levels; for example, the desired level of performance, levels of participation and decisions regarding content, goals, direction, venue and pace of a given session (Eastabrook and Collins, 2020).

Underpinning an adventure sports coaching practice is the coach's Professional Judgement and Decision-Making (PJDM) (Collins & Collins, 2016), which is underpinned by a sophisticated epistemological belief (Christian et al., 2017; Collins et al., 2015). Unsurprisingly, the adventure sports coach's epistemological beliefs place a value on adventure, independence, reflective practice, adaptability and flexibility (Copper & Allen, 2017). As Mees et al. (2020) identify adventure sports coaches are adaptive experts. The coach's epistemology is manifest via their PJDM as it determines their actions in delivering suitably judged levels of and progressions towards independence and adventure. In common with a lot of coaching, the coach manipulates individual, task and environmental constraints to achieve these coaching goals.

PJDM proposes an intuitive, naturalistic decision-making process synergised and nested within a classic, slower, rational process that checks for errors (Collins et al., 2016). These are reflective processes, pre-action, in-action, on-action while still in context and on-action that influences execution, and the coach's learning (Copper & Allen, 2017). Mees et al. (2020) characterise this as an essential aspect of the adaptive expertise cited earlier reflecting the complex interaction of the environment. It would seem logical that the personal constructs of adventure and independence are also situational demands. Combined with the highly individualised characteristics of coaching in adventure sports it is unsurprising that authors also report a high cognitive load for the coach (Collins & Collins, 2019; Mees et al. 2020).

For the adventure sports coach to make effective and safe judgements and decisions regarding their practice, they clearly require an understanding of student motivation, their construct of adventure and specifically for this paper the nature of independence sought by the student if they are to successfully individualise the coaching process (Eastabrook & Collins, 2020). Independence is clearly highly sought in any athletic endeavour. However, independence can be to a greater or lesser degree, within adventure sports this is highly contextual and responsive to the situational demands bought to the coaching process by the individual. The coach has to navigate significant safety and performance implications making complex judgements that rely on a clear capacity to project both the environment and the individual's performance given a set of coaching interventions. Navigating this complexity, balancing suitably safe participation with and without a coach, making judgments on the level of independence and the commensurate risk an individual may be safely exposed to when independent. Consequently, we explore the coach's role in developing independence and how that might inform adventure sports coach development.

Methodology

A sample group of five high-level adventure coaches was observed for two, typically day-long adventure sports coaching sessions. Semi-structured interviews were conducted following each session, yielding ten interviews. Interviews explored the coach's practice with a particular focus on the strategies employed to develop the learner's independence. The interviews were subsequently thematically analysed.

Researchers' Positioning

Removing all potential bias from qualitative research is improbable and in this case undesirable. Attempts should be made to be transparent about potential biases to

safeguard the findings. In alignment with good practice, a short background of the first and second authors is offered. They are white males with a combined experience of coaching adventure sports of over 50 years, both holding high-level NGB coaching awards in a range of adventure activities. They have worked professionally as adventure sports coaches and coach developers in the UK for over 30 years. Their research interest is in better understanding coaching practice and they have been active researchers over the last 10 years. They take a primarily post-positive research stance that draws on pragmatism as an underpinning philosophical position (Morgan, 2014). Whilst acknowledging author bias aids the transparency of the findings, there is also an advantage in the experiences and standings of the authors in interpreting the findings. Indeed, we subscribe to Olive's (2020) view that research is through the author. From an ontological perspective, the authors take a position that multiple realities exist where we are aiming to find the most probable narrative for a given circumstance. Epistemologically, meaning is constructed from the interplay between subject and object where the authors' backgrounds and experiences are ideally placed to make sense of this interplay, characterised as social constructivism (Palincsar, 1998).

Participants

A purposive sample of 12 coaches was invited to take part in the study. All met the inclusion criteria: holding at least one high-level activity-specific coaching award from their relevant NGB; having over ten years; coaching experience since senior accreditation; an explicit and stated desire to teach for independence; and an openness and willingness to engage in research. Such criteria have been used in previous research investigating high-level adventure sports coaching practice and are used here for consistency (Collins et al., 2016; Copper & Allen, 2017). A further screening process was

used to ensure the suitability of the sample and to aid trustworthiness that would safeguard the findings.

Seven coaches were removed due to self-declared lack of currency as a high-level coach (n=1); potential for bias, referencing the authors as influential in their coaching practice (n=2); lack of availability (n=2); and a predominant focus on curriculum-driven courses such a coach education or with young people in an education context (n=2). The remaining five (See Table 1) represent a heterogeneous, purposeful sample of three men and two women. Pseudonyms have been used to preserve participant anonymity.

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Procedure

The procedure is broken down into three subsections for clarity, pre-session interview, practical observations and post-session interview. Ethics approval was gained before the start of the study from the University of Central Lancashire BAHSS ethics committee.

Pre-session Interview

Following written consent, the participating coach and author met before the observed session to continue rapport building and explore the coach's practice and goals for the session that provides a clear contextual grounding (Morrow, (2005, p. 253). Interviews were conducted by the first author at locations agreed with the coach which was the venue for the day's coaching activity. The mean duration was 25 minutes. The notes from these interviews were used as a reflexive aid during the analysis of the subsequent post-session interview to ensure accurate meanings, thus improving the richness and depth of findings Sparkes & Smith (2009). The pre-interview transcripts did

not contribute to the thematic analysis as that set of interviews grounded and contextualised the observations described next.

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Practical Session Observations

The first author adopted the peripheral member research approach (Angrosino, 2007, p. 167); being present in the setting to gain an insider perspective and understanding of the context but not participating directly in the activity. The author captured video footage of the coaching sessions using a discrete, body-mounted camera (a GoPro Session) so as not to unduly alter the coach's behaviour (Sparrman, 2005). The participating coaches reported feeling comfortable with video due to the prevalence of such cameras and frequent use by their students to record their own experiences however, the coaches' knowledge of the focus of observations should be cited as a limitation of the methods used. Field notes were taken throughout the observation, constructing a narrative of the activity with an in-action reflective commentary (Montgomery & Bailey, 2007). The field notes and video were used in the post-session interview to ensure accuracy of recall (Rosenstein, 2017) and later in grouping codified units. Notes were made against an operational definition of coaching actions that seemed to have a direct effect on the learner's degree of independence, either enhancing or reducing it.

Post-Session Interviews

The post-session semi-structured interview guide was drafted and then refined using two cognitive interviews following the guidance of Beatty and Wills (2007) and Drennan (2003), with two representative coaches. Changes were made to the style, structure and presentation of questions to aid the quality of the interview (see Table 3).

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Interviews were conducted once the learners had finished for the day. We acknowledge the potential for post hoc rationalisation, however, we felt this was balanced against the cognitively depleting demands of the coaching process and the interview. The coaches needed a chance to decompress. These post-session interviews were conducted in comfortable, convenient locations. Questions from field notes and video clips were selected before the interview based on the observation and notes in which independence had been a key factor. As suggested by Rosenstein (2017), these clips and notes were used to delve into the coach's responses during the interview and thereby increase richness and depth. For the video clips, the coaches were shown a clip and then asked to explain the development of independence using the secondary questions as prompts. The mean interview time was 72 minutes. Interviews were digitally recorded using a digital recorder for later transcription.

Data Analysis

Following the procedures developed by Braun et al. (2018) and noting the reflections of Braun and Clarke (2019), a six-step reflexive thematic analysis was conducted on the post-session interviews. The post-session interviews were transcribed and codified by the first author to ensure a single coherent data set. The transcripts were read and reread, listening to the audio to enable correction and immersion in the data and improve understanding. Codified units were identified by significance as indicated by the interviewee or by the authors reflecting the research aims and focus participant, selected from the transcripts in a semantic reading. Field notes were used reflexively to aid comprehension and to assist with coding and labelling of subsequent themes (Ruck & Mannion, 2019). Post-session transcripts were read and reread several times developing

the themes and their meanings which were checked against the reflexive tools: the pre-session interview transcript, field notes, and video and interview notes. This coding was performed in NVivo 11, facilitating good visualisation of the coding.

Coded units were exported into Excel for ease of data manipulation. This allowed the development of rich low-order themes through a 'thought-out adventure' approach (Braun & Clarke, 2019, p. 591). The codified units were grouped and regrouped to reach a convergence of lower-order themes that gave an emerging narrative of the coaches' practice concerning their stated aim of developing independent performance. Mid- and higher-order themes were subsequently developed and regularly reviewed against the field and interview notes, low-order themes allowed grouping of the volume of themes and units and significance emphasised in the transcripts (Krane et al., 1997). At this grouping stage, consideration was given to possible, linked, latent concepts. To aid trustworthiness, peer debriefings were conducted between the first and second author and then again between the first and the third and fourth to reduce bias and improve the narrative of the findings, where the mid- and higher-order grouping process was repeated each time (Sparks, 1998). This allowed for the assessment of the degree of convergence and refinement of the names and therefore meanings of the mid and high-order themes. Peer debriefing acts as an audit of the data, improving the reliability of the analysis (Shenton, 2004), reflecting the backgrounds of the authors who acted as critical friends who bring knowingness and relevance to the analysis (Braun et al., 2018).

Results and Discussion

Braun and Clark (2019) suggest that results and discussions can be treated separately, as is common in research, or can be combined. We have combined to explore the meanings of each theme fully and their relationships to the existing literature. The thematic analysis developed three higher-order themes: developing a cognitive

performer, an attuned coaching process that fosters independence; and developing the individual's capacity to learn. The first is formed of two mid-order themes, 11 lower-order themes and 198 codified units. The second, three mid-order, 34 lower-order and 490 codified units, and the third, three mid-order, 28 lower-order and 398 codified units. Table 4 provides a breakdown of the construction of the higher-order themes with mid-order themes and exemplar quotes. Each mid-order theme is in turn discussed against the literature, within each higher-order theme subheading.

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Developing a Cognitive Performer

The higher-order theme; developing a cognitive performer, is comprised of two mid-order themes: teaching for comprehension of performance and developing an adaptive performance.

Teaching for Comprehension

All the participating coaches identified that learners need to understand their own performance and its context to allow adaptability, fostering a capacity to learn and to become independent. Carol elaborates, 'understanding helps when they are trying to figure things out for themselves'. Equally Tony stresses that it's 'pretty fundamental for me with a lot of learning, particularly when it comes to independence, again that there's a depth of understanding to whatever it is they're doing' while Steve highlights '[learners] have the brain space to be able to cope with that to go, "oh, yeah, this is better than that's why, I see why now" it's, a 'comprehension'.

Comprehension is identified as a feature of long-term learning that supports retention and skill transfer (Soderstrom & Bjork, 2015). A typical strategy reported by

the participants was to support comprehension via discussion of the pros and cons of different aspects of the technique with the learners. James exemplifies, 'by verbalising what's going on and giving the pros and cons, they get an insight into that [complexity]'.

However, improvement in performance does not necessarily translate to improved long-term learning or vice versa (Soderstrom & Bjork, 2015). This difference is essential for the adventure sports coach because independence requires long-term learning, whereas an adventurous experience may only require a single one-off performance; the passenger, participant, performer continuum (Brown, 2000). Consider an individual the services of a mountain guide to ascent a specific peak against, another seeking coaching to move from indoor climbing to outdoor climbing and climbing coaching for competition. The coach selects a pedagogic approach that suits the learner's construct of independence; they may want long-term skill development or a single one-off under the supervision of the coach.

The coaches reported teaching a loose set of adaptable and flexible skills that can be applied and reapplied in many different contexts or environments, necessitating an understanding of the technique, environment and interaction. It is this understanding of constraints and their effects that differentiates this constraint manipulation from a cognitive rather than ecological perspective. As Collins et al. (2016) opine, the suitability of any teaching strategy depends on the individual, the context and the desired outcome. Thus, the learner's understanding extends beyond just how to perform and into what and why they are doing it, the tactical aspects of performance (Berry et al., 2015). This creates a performance that is the application rather than the replication of technique.

Teaching for Adaptability

The coaches emphasised the need to develop adaptability. Adaptability allows the learner to perform by modifying what they do without the coach being present, improving independence and confidence (see Collins & Collins, 2020). A point also made by Greenburg and Culver (2020) and Ellmer et al. (2020) in their studies of learning in action sports. Natasha explains that the development of technical performance into adaptable performance must start early. She acknowledged that she is no longer teaching the learner how to spin but giving her different ways of experiencing the sensations of the spin, allowing and encouraging her student to become adaptable. The coach recognises the need for adaptability as a response because of the hyper-dynamic environment in which no two instances are identical (Christian et al., 2020). Adaptability via independent learning ability (Claxton, 2002) and independence are seen as synergetic by the coaches. Carol states 'we will get to the point where they [learners] can do it themselves'.

Linked to adaptability is the need for situational awareness. The coaches implicitly encouraged a high level of situational awareness (Endsley, 1997), though this was not an explicit aim. Tony breaks down the possible options and encourages the development of principles rather than rules that underpin the technique and highlights aspects of the situation that may dictate different courses of action. The coaches are aiming, implicitly, for a projection level of awareness in which adaptation can be anticipated (see Mees et al., 2020). Further discussion on the suitability of situational awareness in an adventure sports coach would require a further, more specific, investigation.

As a part of teaching for adaptive performances, all coaches in this study were developing the learner's ability to make decisions that affect the nature of their

performance. Carol explains that the first step is often to encourage the learners to recognise the need for a decision because a particular technique is unsuitable. She reports telling her learners, ‘I need you guys to make a decision’. However, Carol continues, 'it takes quite a long time even when you are used to doing it… you have to persevere'. Tony also highlights the difficulty of making decisions in adventure sports to their learners by having to ‘encourage them to make a decision’. Reluctance to make decisions has not been previously reported in adventure sports learners, but has been in adventure sports coaches; Collins et al. (2016) reported that coaches need to develop confidence in their decision-making ‘over time and practice’ (p. 7), which would seem to be equally true of learners. The consequences of a poor decision have the potential to be disastrous and confidence in that skill is a key factor. Carol and Tony are developing confident learners via decisions and adaptation to performance. James echoes this; ‘[learners] start to understand that there’s a lot of complexity within [adventure]’, suggesting that embracing this complexity would help the learners develop adaptability. Tony observes that over time, the learner’s decisions become, 'more generalisable to different situations and different environments, which starts by gaining confidence in specific places'. The decision-making process becomes transportable between contexts as part of a problem-solving strategy. Tony’s example highlights the interrelated nature of the higher-order themes, where a specific focus on confidence has a positive effect on the learner’s development.

This higher-order theme reveals a narrative that the coaches are framing performance in terms of the construction of a valid solution to the problem of their desire to participate, the level of skills needed and the environmental impact, rather than a replication of specific performance. The coaches sampled here are encouraging their

learners to take ownership of their decisions and embrace the complexity of adventure sports performances.

Attuned Coaching Process that Fosters Independence

This higher-order theme consists of three mid-order themes; a specific focus on developing confidence, sophistication in feedback and structuring activity to facilitate in-session independence.

Specific Focus on Developing Confidence

In all the practical sessions, confidence is a stated focus. Tony offers an example, 'the objective around the session from their perspective was increased confidence'. The coaches reported that many of the learners described the coach's belief in them as empowering. The participants allocated time and strategy to developing confidence at the expense of technical or tactical development. A point highlighted by Carol, 'I could take them there and do lots more instruction with them, but for them what they'd want that feeling [of doing it themselves]'. Here coaches are prioritising personal development rather than performance development as anticipated by the adventure sports coach's defined role (Collins and Collins, 2016) and seen in youth sports coaching (Turnnidge et al., 2014).

The coaches ensured that the learner achieved a personal goal, even if this changed or evolved over the coaching session. Setting and achieving a specific goal has been reported as a source of self-efficacy in world-class performers (Hays et al., 2007). From the learner's perspective, this included an aspect of challenge where they thought there was a real chance of failure. Carol explains the structure of a multi-day coaching course built towards goal accomplishment:

> You are just putting in the foundations on that first day of a lot of little individual things and then we did a bit more on the morning of the second day. Then they managed to put it all together to produce that final performance which was excellent.

Curran et al. (2015) and Thomas et al. (2011) report that confidence is developed over time. We see that Carol builds the learning towards performance over the coaching programme aiming for goal accomplishment via a mastery of performance.

James also highlights the importance of goal accomplishment adding the value of vicarious experience in developing self-efficacy, two sources of efficacy initially offered by Bandura (1977). More recently, Samson and Solmon (2011) also support these two sources of self-efficacy as still pertinent despite the 50 years since they were first reported by Bandura. Coaches are developing confidence in their learners in a considered and structured way using a blend of approaches.

James cautions that students can become saturated, 'sometimes it's really easy to just go that little bit too far with people. And not acknowledge where they're at …maybe they're just knackered and worn out, putting the hard-earned confidence at risk'. Steve describes enacting a parental role, taking back control of a session to ensure a positive outcome, retaining the learner's feeling of accomplishment and building the tools for future learning. At this point, the coaches are explicitly protecting the learner's self-efficacy.

Sophistication in Feedback

In developing a cognitive performer (mid-order theme of cognitive performances), coaches were using discursive feedback to explore the pros and cons of

their options. All the coaches in this study employed a range of feedback methods and structures. Tony justified the use of quick and direct feedback for near-instant changes in performance, 'if quick fixes are available that permit me to open some doors for them so that they can step through, and let's say explore or experiment with options'. Tony's behaviour contrasts with the literature that reports the positive relationship between augmented or delayed feedback and longer-term retention (Soderstrom & Bjork, 2015; Vickers, 2007). Delayed or augmented feedback would seem the best option to promote independence. However, the format of feedback depends on the potential outcome and context, in this case permitting the learner accessibility to a more productive learning environment. Highlighting the range of feedback coaches might use, Tony describes, 'a willful refusal to give them feedback', that encourages the learners to generate their own feedback, supporting independence later in the coaching programme where the learners 'finally reaped the rewards' of his refusal. Employing the full range of feedback options requires a PJDM approach, as reported in adventure sports coaching practice. Tony knows when to give instant direct feedback to create change and when to reduce feedback to encourage greater cognitive effort and longer-term learning.

Another feature of the feedback was its frankness. Carol details the bluntness of the situation when it comes to ensuring safety in adventurous environments when she anticipates her learner's seeking independence:

> When I saw that those guys are properly wanting to go strap themselves in places [be independent post-coaching], so when it was good, I told them it was good [safe], when it was bad [unsafe], I definitely told them it was bad. There was no being nice really, as far as if I saw anything mission-critical, there was no ambiguity […] I was being quite blunt whether it was safe or not.

Carol's bluntness reflects the fundamental responsibility of coaches to keep their learners safe, both when with her and in their future adventures. She perceives a responsibility for their future security by being their coach. This example is also balanced with non-verbal feedback, where Carol repeated what her learners noticed, 'well, you obviously think I can do it; otherwise, you'd be right next to me'. Here, Carol's position relative to the learner gives feedback on her view of the performance. Both her examples of feedback were built on knowing the learner and emphasise the importance of good interpersonal skills, which aligns with coaches in other domains: business coaching (Ianiro et al., 2015), Olympic sports coaching (Jowett & Cockerill, 2003) and learner expectations in adventure sports (Eastabrook & Collins, 2021). In a potentially stressful environment, during performance pressure, a strong bond between learner and coach appears to permit a frankness in feedback that may not be accepted in other contexts but is considered to be appropriate by the learners. As Jowett and Slade (2021) highlight that it is the authenticity and trust in the relationship that ensures learners believe the coaches' intentions are positive towards them, even when the feedback is frank. Critically, honest and potentially frank or blunt feedback guides the learners to safe and adventurous independent adventures. Both that they are capable of being independent or critical pieces of knowledge that will keep them safe.

Structuring Activity to Facilitate in-session Independence

The coaches sought to capitalise on the environment to facilitate learning. James explains, 'I can make an opportunity where you will [learners] get a powerful right answer'. James could provide the answer or allow the learner to experience the answer themselves. Whilst this resembles a dynamical ecological approach (Anson et al., 2005), the coaches stress that they are engineering these opportunities through careful venue selection and skill acquisition leading to such moments, or how the task is framed to the

learner; more akin to guided discovery (Mosston & Ashworth, 2002). Such learning requires cognitive effort on the part of the learner to understand the significance of particular environmental factors. For example, they are using a developed high-level situational awareness to adapt performance as discussed in the first higher-order theme.

Similarly, Tony created an 'opportunity during that period to paddle with freedom within that part of the tide race to set their own challenges', which acknowledges Tozer et al.'s (2007) and Mees et al.'s (2020) point that the development of adaptive skill requires practice with that purpose. Practice with that purpose develops self-efficacy through experimentation, error recognition, adaptation and feedback, as would be common in many forms of coaching. In addition, the unstructured nature of such freedom or solo time allows for a contextual sense-making or 'situatedness' of any potential learning (cf. Kalisch et al., 2011). During such free practice, the coaches were careful to support the learner's experience and ownership:

> If I suggest better alternatives, they might or might not remember that. But it seems to me that what is likely to happen is that their sense of independence at that moment gets eroded, rather than enhanced. And it seems to me that we don't risk their growing sense of independence quite as much if they are permitted to commit to their actions. And if it's a slightly sub-optimal outcome, as long as there aren't important safety issues attached to it, then a willingness to commit to decision-making seems to grow. (Tony)

Carol echoes the safety aspect, 'the only time I'm going to probably interfere is if I think it's radically unsafe or that it's going to perpetuate a poor behaviour in the future', and comments that she might add a safety factor but, 'it will all [be] very, very low key, you

don't interrupt or stop the process that [the learner's] going through'. This appears to be a risk-versus-benefit decision on Carol's part. One interesting factor is that due to the independence fostered, as long as safety is not compromised, the learner-owned sub-optimal solution trumps a coach-intervened optimal one. Consequently, the learners can come up with their own possible but not optimum solutions to their own performance situation.

The use and acceptance of sub-optimal performances may be a critical difference between high-level adventure sports coaches and high-level traditional sports coaches. It's logical to strive for optimum performance in traditional sporting, but this contrasts with the learner's individualised personal conceptualisation of adventure and independence where the learner writes and rewrites the 'rules' for participation. Literature reporting coaches specifically sacrificing performance appears rare, requiring further investigation. However, in pursuit of removing barriers to green physical activity (Grimwood et al., 2014; Patel et al., 2012; White & Smith, 2014), these strategies focus on wider factors other than just performance could be useful. The direct implication is that adventure sports coaches, at times, decide to prioritise ownership, confidence, and durability of performance and thus independence over the *ideal* technical or tactical performance.

This second higher-order theme articulates high-level coaching processes that develop confidence in the learners through a mastery of performance that achieves a specific goal. Equally, a strong coach-learner relationship permits the coach to draw on a range of feedback strategies including blunt, non-verbal, short/direct and discursive to foster independence. Finally, coaches here prioritised ownership and a sense of independence over optimal technical and tactical performances, allowing sub-optimal but safe performances.

Developing the Individual's Capacity to Learn

The third theme is constructed of three mid-order themes: practical aspects of learning in adventurous environments, developing an ability to learn socially and increasing learner's ownership of learning.

Practical Aspects of Learning in Adventurous Environments

All the coaches highlighted the significance of preparing the learners for their own adventures. Carol explains, 'we talked quite a lot about venues, crags to go to, making sure that when you're going there, everything's in your court'. Brymer (2010) highlights that preparation is a crucial aspect of risk management; however, the planning described here extends beyond risk management toward positive performance and learning opportunities. The coaches prepare learners to anticipate changes in the environment and how to adapt to them. For example, Steve 'talked a lot more about consolidating their tidal flow experience' to give meaning to their planning. The coaches achieved this by exposing the learners to the 'fullness [most adventurous]' of the hyper-dynamic environment to clearly understand their environment, reinforce their self-belief and contextualise future learning. Such experiences provide the authenticity desired by learners. Natasha explains that, 'I really encouraged them to think about practising things in a lower [easier] environment'. Carol comments on authenticity, 'they just need a little bit more time and that sort of stuff to make sure it all beds in properly. Exposing the learners to a learner-perceived full experience in a hyper-dynamic environment contextualises the learner's future learning. It provides the learners with the opportunity to identify the abilities they need to achieve their desired independent performance and take ownership of their learning, conforming to self-determined learning where learners learn to take ownership of their progress (Blaschke, 2012).

Carol highlights that such exposure with a coach present allows room for mistakes, enabling learners to figure it out for themselves while having the coach as a 'safety net'. The coaches here embrace the complex environment, allow for mistakes and exploit them for further learning. James is keen for the learners to know that 'there aren't absolute black and white answers'. The coaches' reluctance to turn to right and wrong answers reflects two aspects of Schommer's (1994) epistemological dimensions, sources and certainty of knowledge. The coach views this sophistication as vital to aid the learner's development towards independence and the learner's ability to learn from their own errors thus demonstrating control of the learning.

Practising skills with the coaches also gave the learners self-belief and the belief that their goal was achievable. Steve exemplifies this: That feeling of, okay, I've got a handle on this, I know what I'm doing. This contrasts with the possible out-of-control sensations associated with thrill-seeking and risk-taking historically and wrongly associated with adventure sports (Brymer & Gray, 2009). Tony is more explicit, 'it lies entirely within your abilities to take yourself back to places like that and organise that kind of training [experience].

Carol cautions that 'what's going to be important now is them [learners] getting out and using it as quickly as possible' as the benefits of exposure to the hyper-dynamic environment to facilitate their practice are perceived as short-lived. Learners are given guidance and sometimes explicit instructions on where, what, how and why to practice, to encourage post-coaching development, independently of the coach.

Developing the Ability to Learn Socially

The findings reported in this section add further empirical support to recent publications that highlighted social learning as a function of action-sports learning

(Collins et al., 2022; Ellmer et al., 2020) and learning in nature sports (Collins & Brymer, 2020). Specifically, all coaches view learning as a collaboration between themselves and the learner. This collaboration is reliant on the coach's good interpersonal skills. James elaborates on the informality, 'it felt kind of like we were just having a chat' but 'there's obviously a lot, to the process'. This *chat* is implicit of the benefits of informal learning, the coach plans these individualised interactions as both informal and also highly contextual. Similarly, when encouraging learner reflection, Natasha suggests that, 'sometimes those questions are being pretty open, just getting them to reflect on how well they thought that performance had gone, allowing a holistic recognition on their technical performance'. There are clear parallels with social constructivism as reported in sports coaching (Stoszkowski & Collins, 2014) and shared mental models (Giske et al., 2015), where the coach and learner construct a best-fit performance, see sub-optimal cited earlier, within the shared conception of independent adventure sports participation. Tony encourages, 'everybody to share their personal reflections' as part of developing a micro-community of practice. Natasha acknowledges the cultural aspects, encouraging the learners to 'feel more like they are paddlers' by sharing a language, attitude and knowledge. Thus, the coaches share the culture, behaviours and language knowing that they are facilitating the entry into the adventure community of practice. As Ellmer et al. (2020) highlight the more time spent in a community of practice the more accessible knowledge can become. Coaches here recognise the value of this engagement because it is an aspect of situating the future learning process.

Increasing Learner's Ownership of Learning

The coaches developed the learner's intrinsic feedback mechanisms. Natasha suggests these mechanisms allow the learner to self-check when the coach is not there, an aspect of independence. She is asking her learners, 'what makes [one] flat spin better

than another?' Natasha uses questions from this open question to guide the students to develop answers. Fostering intrinsic feedback in adventure sports coaching practice confirms a point made by Christian et al. (2020), who suggest that this is desirable, given each situation's unique nature. The process reported here by Natasha could be considered self-checking, a student-led approach described by Mosston and Ashworth (2002) in physical education. Natasha and her learner are developing a common language to understand their performance so is collaborative in nature. Developing the learners like this seems novel to adventure sports coaching practice, particularly in the degree to which the learner is empowered to continue their learning. The learners are determining the success criteria and using feedback to measure their own performance.

All the coaches are developing the learner's ability to reflect on their own sensations and experiences and reduce their reliance on the coach. Tony highlights the progressive nature of developing such reflective skills, 'it took us a couple of days to arrive at a point where they embraced the idea that I really didn't want to have to tell them too much anymore'. Initially, Tony's learners wanted him to help them make sense of and to structure their reflection. However, Tony was shaping his coaching interactions over the programme to wean the learners off his feedback and onto their own, therein learning independence. Carol echoes Tony in a practical sense whilst on the activity:

> That idea of stopping, thinking, planning, I had to prompt him quite a few times on the first route, but by the time we came round to the second route, he was starting to realise that he needed to be doing these things for himself and he did that the whole way up, the second pitch that he led.

However, in contrast to Tony, here Carol encourages her learners to reflect on-action and in context, a timing of reflection described by Collins and Collins (2013), to aid their

performance by creating opportunities for reflection during the activity, whereas Tony refers to a more structured on-action reflection (Schön, 1983). Reflection is a dimension of expertise in many fields (Schön, 1983). Hickman and Stokes contend that reflective abilities would aid practitioners in their sense-making abilities but suggest that practitioners often ignore reflection to focus on technical development. In contrast to their point, the high-level practitioners here were coaching to develop reflective practice in learners alongside their technical ability through a range of reflective tools. This appears to reflect the learnacy skills highlighted by several authors (Agonács & Matos, 2019; Claxton, 2002; Green & Schlairet, 2017).

This final higher-order theme builds an account of coaching practice that takes learners into the fullness of the adventurous environments to provide a context for their future learning, an experience that also fulfils aspects of the desired coaching experience and in the development of the learner's confidence. Equally, the coaches are offering cultural and social engagement to aid their post-coaching learning potential and giving the learners tools to learn themselves. Developing the ability to learn in adventurous environments recognises that the benefits of coaching may only be short-lived without independent practice. Therefore, coaches are giving the learners a better understanding of how learning takes place in adventurous environments, what to learn and where to practice, guiding post-session development.

Practical Implications

The adventure sport NBGs emphasise autonomous performances, from both a cognitive (Fitts & Posner, 1967) and ecological (Brymer & Davids, 2013) position of skill acquisition. These findings show that coaches are developing comprehension and adaptability of performance through decision-making where these cognitive efforts are at

odds with these theories of skill acquisition. Further work could determine the degree and nature of cognitive effort that would inform more appropriate models of skill acquisition in adventure sports. However, these findings suggest that teaching learners to think and understand their performance is an integral aspect of independence. As such and specifically, these findings should promote adventure sports coaches to support learners to adapt their performance via explicit consideration based on their perception of the environment. To realise this coaching strategy, the coach's ability to articulate their perception, action and justification will be a key ability and will require experience.

Equally, this exploration of coaching practice touches on existing literature that seems to offer the most likely explanation of the coaches' behaviours; shared mental modes (Giske et al., 2015) and learnacy (Claxton, 2002) are two examples. More specific investigations are needed to gain more evidence for this use in adventure sports coach education, but the findings here offer a direction for inquiry. These examples offer exciting venues for enhancing understanding and development of coaching practice that could be of benefit to those outside adventure sports, such as those aiming to facilitate independence in green physical activity where health and wellbeing are primary objectives.

Limitations and Future Directions

The final sample of five coaches could be strengthened through a wider recruitment campaign that would increase the breadth of the findings. Equally, interviewing beyond two coaching sessions could be expanded, particularly where the participants are high-level coaches in more than one adventure sport. More sessions would create a richer data set while also allowing any potential differences between adventure sports to come to light. Lastly, this study only sampled UK coaches, limiting the potential generalisability of the findings. Expanding the scope to seek perspectives

outside the UK and separately between adventure sports would be worthy of further investigation in answering the need for this study as set out in the introduction. The findings indicate the potential suitability of specific coaching practices such as cognition in performance. There is now interest in sufficiently narrow investigations to support these indicative findings with the view to inform coaching practice and education.

Conclusion

We used semi-structured interviews based on two coaching sessions to explore how independence may be developed. The findings show that coaches are developing a conscious representation of the performance to scaffold future learning post-coaching; the *what* and the *why*. Coaches are also developing the individual's ability to learn in adventurous environments, allowing them to take ownership of their development post-coaching; the *where* and the *how*. For the coach, this is achieved with a coaching process that has the stated aim of developing independence, which is the lens through which these adventure sports coaches operationalised their PJDM. These findings do not draw on a single coaching strategy or paradigm, highlighting the need for coaches to be able to choose the appropriate tool at the most appropriate time to develop independence.

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Table 1

Demography of the coaches

Coach	Age	Experience in adventure sports (Years)	Specialist Activity (Interview focus)	Qualifications Title
Tony	47	25	Sea Kayaking	British Canoeing Level 5 White Water, Sea Kayak
Steve	56	30	Sea Kayaking	British Canoeing Level 5 Sea Kayak
James	35	15	Winter Mountaineering	Winter Mountaineering and Climbing Instructor
Natasha	36	15	White Water Kayaking	British Canoeing Level 5 White Water Kayak
Carol	43	25	Rock Climbing	Winter Mountaineering and Climbing Instructor

891 **Table 2**

892 *Pre-session interview guide sheet*

Opening Question	Secondary question	Probes	Time
Group			
What is the background of the group you are coaching?	Who are they? Where do they come from? i.e. club, group, marketing/internet? What do they want from their coaching? How does this coaching fit into their wider picture of participation?	Inspiration Objectives Learning Confidence TTPP Social group Location New independent adventures Enjoyment	5
Session			
What are the objectives for this session?	How does this session fit within the whole coaching episode? What have you done to prepare them for the session? How will future sessions link to this session? Is there anything you are including that the clients have not specifically asked for, but you are covering? Where is it going to take place and why?	Long-term goals Short-term goals? Pre-learning Seeds for the future? Safety Environment Logistics Reflection Motivations Planning Individualisation Adventure?	10
Approach			
How do you plan to achieve your session objectives?	What coaching strategies do you plan to deploy? When/how will you use each? How will you know if it's working? How will the environment impact learning? How do you think this will foster independence?	PJDM Awareness of group Technical development Deliberate practice Individualisation Independence Ability to learn Ownership Ability to make decisions Foster confidence	10

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Table 3

Post-activity interview guide sheet

Opening Question	Secondary questions	Probes	
Reflection How did the session go?	Do you think you achieved the objectives you set out pre-session? What was a key moment in the session? Why? Impact? How successful was the session? Was the learner's notion of independence realised?	Reflection Planning Alternation; why, how Flexibility Adaptability Linear	Success/failure Arousal levels Extend of planning Value for money Learners' future learning/participation
Learning ability How has learning capacity been developed in this session?	What learning tasks/challenges were set? Why/How? How did the group influence individualisation? How/when was feedback given? How did you facilitate any reflection on the session? Do you think they developed anything implicit from the session? How would this session impact future sessions? What would you like to see the learners practice in the future?	[Video footage] Practice Ownership Awareness of learning? Arousal levels Self-efficacy TTPP Limitations Environmental factors Social learning Feedback Demonstration/modelling	
Decision-making How was their personal decision-making developed in this session?	Were the learners able to gain ownership over their decisions in the session? How and why? What were the decisions they were making? Did you explain your own thinking at any point? Why? How will they use their DM in the future?	[Video footage] Reflection in action in context Limitations Pros and Cons Awareness of decisions Self-efficacy TTPP Environmental factors	Social learning Questioning Feedback Adventure first / context
Confidence Did the learner's confidence levels change throughout the session?	What did you do with them to achieve this change? How and Why? Did you share any of your own experiences with the learner to benefit their development? How and when? Did the learner achieve a particular goal/accomplishment? What and how? To what extent do you think that change is long-term?	[Video footage] Learner reflection Environmental impact Adventurous experience Level of challenge Ownership of activity Personal (learner) limitations	Use of feedback Increase in comfort zone

899 **Table 4. The thematic analysis of the post-session interviews**

Higher-order Theme (3)	Mid-Order Theme (8)	Exemplar Codified Units (coach)
Developing a cognitive performer	Teaching for comprehension of the performance	'I think that was quite important, that they have a clear picture of what they're meant to be doing, then they can actually see when it goes wrong and they correct it' (Sam) 'beginning to understand that things aren't as random as perhaps we might think they are' (Steve)
	Developing an adaptive performance	'trying [get learners] to solve a problem rather than just copying a technique' (Sam) 'They want some principles to follow. They want some guidelines that will help them reach out for a decision' (Tony)
Attuned coaching process that fosters independence	Specific focus on developing confidence	'if you give people mechanisms to kind of cope and to be able to manage when their confidence drops, then yes. Then we're onto a winner' (Natasha) 'I was like actually let's just let this go because it'd be empowering for him' (James)
	Sophistication in feedback	'their underpinning foundation skills are pretty strong. It's just an unfamiliarity with the environment. And as a consequence, I was able to take something other than a very direct approach' (Tony) 'it's less direct coaching. And it's more, have you thought about this, have you thought about that' (Steve)
	Structuring activity to facilitate in-session independence	'I could take them there and do lots more instruction with them, but for them what they'd want that feeling of being independent' (Sam) 'let's park it now because I can make an opportunity where you'll get a powerful right answer' (James)
Developing the individual's capacity to learn	Practical aspects of learning in adventurous environments	'they need to consolidate for themselves' (James) 'realising that between the two of them there's knowledge and they can actually figure these things out if they put both of their brains together and put the ideas out' (Sam)
	Developing the ability to learn socially	'I'm using any anecdote or evidence to help bolster their experience, kind of justify, so they're not going to get the absolute answer' (James) 'I did not want to contribute to their discussions, because I was mindful that they may attach weight to anything I suggested' (Tony)
	Increasing learners ownership of learning	'he does a smooth flat spin that intrinsically feels nicer. So we're kind of talking about sensations on the boat as you're in the feature and so making him think about those things as well' (Natasha) 'being open with them kind of facilitated that process and helped them to draw comparisons between the two exercises' (Tony)

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