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The hills are alive with ... Many different folk! Rationalising and operationalising a professional judgment and decision making approach within mountain leadership

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ABSTRACT

Growth in the adventure sector has increased the demands on adventure sport professionals. Satisfying a diverse range of participatory motivations, however, requires an adaptable and flexible workforce. In this discursive paper, we suggested that a narrowing of service skills caused by commodification and sportification are compounded by general (mis)perceptions of *who* best suits the adventure sector. Accordingly, this paper discussed two important implications for outdoor professionals to improve inclusivity standards. Specifically, using mountain leadership as an exemplar, we firstly, presented themes in connection with motivations and social dynamics. Secondly, we contextualised these themes against pertinent environmental challenges. Finally, we presented a decision making approach and its requisite planning and reflective skill-sets, designed to assist mountaineering professionals to negotiate the complexity presented by individualised service provision. We concluded that there are no simple solutions to these complex and multiple issues. Services require better alignment between epistemology and delivery via an epistemological chain.

KEYWORDS

Hiking/hill walking; leisure; metacognition; nature sports; professional practice

An important case has recently been presented for a comprehensive and nuanced analysis of adventure sports, going beyond the general (mis)perception that these are characterised by thrill/rush, sensation seeking attitudes (see Buckley, 2012) and/or risk taking behaviours within dangerous environments (Collins & Brymer, 2020)¹; in short, what many (non-participating) observers would describe as adhering to the 'adrenaline junkie' stereotype. Instead, authors have long proposed a need to focus on participants' lived experience of adventure sports (e.g. Brymer & Schweitzer, 2017; Eastabrook & Collins, 2019; Kelly, 1955). When defining sports (or activities) of this nature as a *personal* construct, it appears that participants' motivations are, in fact, highly varied and complex. Indeed, participants engage with these, often dynamic or hyper-dynamic, environments in diverse ways (e.g. Asfeldt & Hvenegaard, 2014; Ewert, Gilbertson, Luo, & Voight, 2013; Lipscombe, 1999; Woodman, Hardy, Barlow, & Le Scanff, 2010). For some, adventure sport *is* primarily about thrill seeking, for others, control and risk management. Equally, for some participants, it is an adventure tourism activity sought for promoting health and wellbeing, interaction with the environment and/or social interactions. Unconstrained by the rules and boundaries that must be obeyed in traditional sports, participants of adventure sports are allowed the freedom to determine their performance

context, criteria for success and the level of challenge and approach (e.g. timescale) to achieving their goals (Collins & Brymer, 2020). As a result of an individual's relationship with the environment and the activity, *they* create sport-specific ethical codes that are maintained individually and frequently shared between their respective peers and the wider community of practice at, for instance, a crag, play-spot or break (Christian, Hodgson, Berry, & Kearney, 2020). This individualised aspect means that it is nigh impossible to meaningfully conceptualise adventure sports of this nature without consideration of the participant involved; thus, many conceptualisations and manifestations of these types of sports exist.

Accepting a personally defined perspective of adventure carries with it many societal (i.e. inclusivity) and practical (i.e. practitioner skill-set) implications for the adventure sport professional of course, *if* effective learning and performance opportunities are to be obtained (in their many personally defined ways) by their paying clients. It is towards these social and practical implications for the adventure sport professional that this discursive paper aims to inform more optimal service provision. Addressing the first implication is the clear underpinning rationale for promoting inclusivity (Wankel & Berger, 1991) which can be achieved through individualised practice. We are aware that in many domains the terms 'inclusion' or 'inclusive practice' are sometimes overly associated with a targeted group within a population (e.g. based on gender, age, disability, ethnicity). In this paper, we use the term inclusion to mean an all-inclusive approach without directing emphasis toward any persons in particular (Paul, 2010). Secondly, as we unpack later in this paper, inclusion relates to the implied pre-requisite expertise of professional practitioners in being able to facilitate this. To satisfy these conditions requires an *adaptable* and *flexible* workforce, underpinned by a breadth of facilitation skills which rely on awareness of individual differences, situational demands and an acuity for cultural associations between the participant(s), activity and environmental context (Collins & Collins, 2015). In practice, the implementation of an all-inclusive approach, and the resulting avoidance of falling into the trap of assuming one size fits all, presents a far more complex and difficult task for the adventure professional due to a greater variety of interactions between the individual, their environment and desired outcome(s).

Paradoxical to this desire for a flexible and adaptable workforce, reality depicts the professional adventure sector as becoming increasingly 'commodified', 'sportified' and 'manufactured' in environment to make activities more recognisable, standardised and saleable (Brown, 2000; Brown & Beames, 2017; Swarbrooke, Beard, Leckie, & Pomfret, 2003). With a pre-occupation on risk and safety management, there is a high potential to 'de-skill' the developing workforce due to an absence of 'tools' to individualise their teaching and leadership practice for different motivational and other pertinent needs. As such, this paper focusses on reinforcing and building upon this current need.

We have chosen to exemplify our case through the specific domain of hill walking/hiking, which was underpinned by three main reasons. Firstly, drawing on research from Collins, Carson, Amos, and Collins (2018) concerning the professional practice of summer mountain leaders, national governing body training presents an imbalance of focus on risk and safety management practices (largely through technical skills; e.g. MountainTraining, 2015), which is only a narrow representation of their service provision (e.g. expeditions on challenging terrain and changing conditions to reach a summit). Secondly, Collins et al. (2018) also identified judgment and decision making ability as being of perceived importance for effective practice and development in the situation mentioned above by summer mountain leaders, yet there was, by their self-admission, a recognised need for improvement in such skills. Indeed, despite the Summer Mountain Leadership award including 'sound judgment' as an outcome of training, this mainly refers to aspects of safety and includes no information on how this outcome can be achieved, leaving trainees to develop judgment in an ad hoc manner through a specified minimum number of 20 quality mountain days (MountainTraining, 2015). Thirdly, with the personalised construct of adventure in mind (Eastabrook & Collins, 2019), hill walking/hiking can for some participants constitute a highly emotional experience with elements of perceived high-risk involved (e.g. Coble, Selin, & Erickson, 2003). Depending on factors such as walking/hiking experience, physical capability or specific sense of place, these can stimulate a range

of responses/sensations, at one extreme this can be nerve-wracking, exciting and perceived as high risk and at the other a relaxing, tranquil and regenerative experience (Vallerand, 2004). Therefore, contextualising how an approach that might assist mountain leaders to enact greater inclusivity through a different (but still familiar) type of challenge was seen as serving to build upon the work of Collins et al. (2018) on judgment and decision making *and* exemplify the necessary adaptability recommended by Collins and Brymer (2020).

Therefore, in this paper, we present these ideas by firstly examining a specific subset of participants, hill walkers and hikers. Empirical evidence from the leisure and tourism literature is presented to exemplify the variety of personal motivations for what is often considered as 'soft' (Beedie & Hudson, 2003) adventure within this domain. Activities involved in hill walking and hiking are not typically associated with the perceived high risks commonly assumed within many adventure sports. Yet, mountain leaders are well used by these participants as part of their working role and, at the same time, also being expected to lead on more arduous, complicated and dangerous expeditions (e.g. International Mountain Leaders being accredited across summer, winter and alpine terrains and conditions; see Collins et al., 2018). Moreover, and considering the personal experience of adventure, an inexperienced hiker might anticipate the challenge of a scramble to the top of a moderate summit as presenting a form of rush/thrill, whereas an experienced and skilled adventure participant might perceive this as low risk/low thrill. Following this, we contextualise these findings against exemplar working challenges and illuminate the implications for practice by summer mountain leaders. Finally, we present the nuanced professional judgment and decision making (PJDM) approach and its requisite planning and reflective skill-sets designed to assist mountain leaders negotiate the complexity associated with individualised service provision. Note that while this paper is discursive in nature, we include purposeful signposting throughout to important empirical studies and primary literature as a comprehensive resource for researchers and practitioners.

Understanding hill walkers'/hikers' participation within the outdoors: emergent themes from the literature

It is somewhat difficult to precisely position hill walking and hiking within this domain, since these activities span from the more sedate activities such as photography and foraging to exposure to mountainous conditions (Boyes, Potter, Andkjaer, & Lindner, 2019; Brymer & Gray, 2010; Crotts, 1995). However, academic literature places hill walking and hiking on the 'soft' side of a soft-hard continuum, with the 'hard' side featuring more 'extreme' activities (Beedie & Hudson, 2003). Perhaps more meaningful to understand is that motivational elements reveal a diversity of push and pull factors for the activity and the locations sought to participate. Indeed, tourism and adventure by its nature entails seeking experiences away from the norm (Hammit, 2000), and thus walking activity whilst on holiday is often different from regular activity (e.g. walking to get to work); although for some, seeking new recreational walking routes at home is also a way of life. Walkers can, therefore, be categorised as casual or serious in their participatory approach (Davies, Lumsdon, & Weston, 2012), which will need to be accommodated for by the leader across a broad range of physical, social and psychological factors.

One key consideration of hill walking/hiking, therefore, is the time required relative to the participants intended experience. Typically, a walk can last a full day, and for long-distance trails, multiple days are taken. Notably, other than challenge walking such as Munro bagging, walking is generally not dependent on being undertaken in the quickest possible time. Accordingly, 'slow tourism' is increasingly discussed as a sustainable, experiential niche which includes that act of savouring the moment and the environment (Dickinson & Lumsdon, 2010); a probable key factor in explaining why some walks are longer in duration than may be required based on physical fitness alone. In fact, 'slow adventure tourism' (an escape from the hypermobile fast society) is also now permeating academic consciousness (Varley & Semple, 2015). Crucially, with such flexibility comes a more significant opportunity for inclusion, *but* also a need for effective time management in

planning by the mountain leader, especially in locations where conditions and weather can be highly variable.

For the serious walker, motivations to undertake activities across these timescales may include endurance or adventure challenge (Ainslie, Campbell, Lambert, MacLaren, & Reilly, 2005; Edensor, 2000). Moreover, walking in groups is increasingly seen as a social and shared experience, with health and wellbeing benefits (Priest, 2007); for example, the goal of walking 10,000 steps. Indeed, the role of technology has increased in facilitating walking activity, notably in sharing online experiences and navigation and in doing so has altered the experience and its appeal (Davies, 2016). Although health is not always the primary reason for why people walk, it is, increasingly, a general motivation which is part of a more complex tapestry comprising being close to nature (Den Breejen, 2007), experiencing spirituality (Sharpley & Jepson, 2011), rural social history and environmental education (Orion & Hofstein, 1991). Clients may want a more insular experience, for example, walking solo, that can involve developing self-regulatory skills, overcoming fears, building resilience and resourcefulness (Coble et al., 2003; cf. Collins & MacNamara, 2012); these are *also* elements the mountain leader can explicitly provide support on for solo (e.g. encouraging a client to summit first) or guided walks depending on the nature of the relationship sought by the participant(s). Finally, wilderness experiences have been shown to provide psychological benefits to individuals in nurturing self-esteem and self-awareness (Scherl, 1988). It appears that the literature on this subset of participants well supports a notion of diverse activity and motivations and in doing so presents a strong case for individualised service provision by professionals within the domain.

Considering the activity itself, indeed even before the physical effort of the walk commences, much of the appeal for regular participants in hiking and hill walking involves the preparation which underpins the walk. 'The journey to the summit' begins with the maps the night before, the conversation between friends in the pub the week before, or the journey to the start of the walk. Accommodation and transport are an integral part of walking holidays and multi-day walks, which may also be the responsibility of the leader to organise (Davies & Weston, 2015). The infrastructure in the nearby villages, for example, determines the experience, as does the state of footpaths and, depending on preference, the absence or presence of signage, again research that could be expected from a leader (Boyes et al., 2019). After the walk, memories of particular instances ('when John fell over in the mud' or 'remember that amazing vista when we came along the ridge') may prolong the experience and act as a useful source of feedback for the leader towards future planning. Wylie (2005) argues that walks are punctuated by a series of instances, as a clock is divided by hours, without the involvement of actual time. As such, and in a similar vein to the work of applied sport psychologists working away at an event (Fraser & Shahvali, 2017), mountain leaders must *continually* monitor to understand their group's dynamic and its situational demands, even during informal periods when they are perceived to be 'not working', such as when in a hut or en-route to the hills. Appealing to the notions of flexibility and adaptability, and depending on the context surrounding the walk, responsibilities of the walk leader are diverse.

From this overview, it is clear that individual walkers have complex needs which are shaped by previous experiences, confidence, logistics, other walkers and individual preferences. Hill walkers and hikers are therefore driven by individually constructed novel experiences which are generated by engaging in activity (Lee & Crompton, 1992). A challenge for managing walking and hiking experiences rests on developing an accurate understanding of these circumstances and their impact on the participant(s). Failure to do so risks participants disidentifying with leaders who may provide assistance to realising their goals and, in turn, stifle growth and development within the sector.

Mountain leaders: working context and potential challenges

Increasingly, research is highlighting the complexities associated with professional practice in this sector, in large part due to the 'open' or 'hyper-dynamic' characteristic of mother nature herself (Collins & Collins, 2016a). Alternatively, some have described the presence of multiple interrelated

factors as being 'wicked' (Horn & Weber, 2007). Specifically, the organic evolution of interactions between the environment, the participant, their aims and objectives for participation as the activity progresses, places high cognitive load on the leader. The challenge is notably increased if the information is difficult to decipher, for instance anticipating the environment, its impact on the participant and also meeting any objectives for the activity. For example, a wicked situation might be characterised by constantly altering conditions and weather. Consequently, these place high physical demands on the group and their likely ability to meet the day's objectives. As such, this complex situation might oblige the leader to change route to avoid fatigue by adjusting distance covered, gradient *and/or* height gained. Therefore, wicked situations make it difficult for the mountain leader to identify, or select, a single best course of action. Indeed, the solution to a problem may generate other problems and challenges for the leader. For instance, extending our example above, let us suppose that the leader had taken the decision to ascend a peak avoiding the directly exposed (e.g. weather, height) ridgeline, instead preferring a contouring path to a col and then up a short steep, but leeward, approach to the summit. This decision may expend less energy overall, but take an additional hour with the consequence that the descent from the peak is partially in the dark. Therefore, the leader might decide to descend a less difficult and slower route but that is safer under foot. A potentially additional hour and a half of walking time is thus a trade-off consequence to avoid exposing the group to on the originally planned ridge. Members of the group seeking the excitement of the ridge may be less enthusiastic and demotivated by the decision (although hopefully sympathetic), whereas, those walking for social or health benefits, for instance, may be less affected *or even* more motivated. Of course, the manner in which the leader presents this change of plan to the group is critical given the interaction between motivational and physiological factors on performance (Barte, Nieuwenhuys, Geurts, & Kompier, 2019).

Notably, these complexities contrast to other traditional sporting situations whereby, despite *some* variation, of course, activities might always be undertaken indoors, on the same sized court, using the same rules and so on. To respond effectively, the leader must anticipate the changing environment while accommodating the aspirations, motivations, fitness and experiences of the participant(s). Crucially, however, these situational demands place further pressures on the leader while also ensuring safety and enjoyment of the activity. In short, leading will sensibly require adaptability and flexibility under such circumstances rather than maintaining a fixed set of procedures or representing the task, environment or participant(s) in an oversimplified way, which is a potential risk of the increased commodification, sportification and practice within manufactured environments mentioned earlier (cf. Collins et al., 2018).

Addressing the client–context challenge: implementing a professional judgment and decision making approach

Catering for the situational demands of participant individuality and a dynamic environment in combination (described above) presents a definite challenge to service provision as a standardised (i.e. commodified) product. Add to this, many organisational constraints such as time and equipment management, and the mental load on mountain leaders can become potentially overwhelming. Therefore, to satisfy client needs mountain leaders have to manage this complexity, accepting the possibility of and preparing for a change in the course of action(s) as the activity unfolds. For example, accumulating physical and psychological stress caused by the terrain may expose one individual within a group as less than able to complete the planned route, and so a compromise decision must be made regarding a route change or techniques for supervision (Boyes et al., 2019). While much previous research has probed the behaviours of experienced/expert practitioners (e.g. Ford, Yates, & Williams, 2010; Schempp et al., 2004) to try and determine routine and/or specific practice that may be attributed with such status, the PJDM approach *also* emphasises the importance of a practitioner knowing *why* these actions were taken as a crucial factor for success. In short, expert practice should not be viewed independently of a predetermined intention (Martindale &

Collins, 2005), especially when adaptability and flexibility are a primary characteristic of the role. Through this lens, effective practice can be understood as relying heavily on good judgment and decision making skill in exercising knowledge, both declarative ('what needs to be done and why') and procedural ('how to do it'). Indeed, previous empirical study has demonstrated skilled decision making as being a central tenet of high-level adventure sport coaches' practice (Collins & Collins, 2016b), and identified as being valued by UK mountain leaders (Collins et al., 2018). As such, the following sections address the key characteristics of the PJDM approach in facilitating the flexibility and adaptability required by the mountain leader.

The nature and timing of decisions

When considering the style of decision making necessary for mountain leaders, two processes appear useful depending on the nature and context of the decision to be made (cf. Shea & Frith, 2016). One, and the more traditionally researched, is a deliberate, analytical, logical and consciously considered style, what is sometimes referred to as 'classical decision making' (CDM; e.g. Thompson & Tuden, 1959). Reflecting such characteristics, CDM can be typified as decisions being well thought through, and so is a viable and effective process for mountain leaders to engage in during the planning process. Practitioners will seek out multiple sources of information or evidence as they try to gain sufficiently deep understanding of the problem and essential presenting issues (Cruickshank, 2013; Martindale & Collins, 2012); for example, mountain leaders may seek out a range of different weather forecasts, condition reports and assess the range of different requirements for any discrepancies. As this understanding is gained, fewer factors are explored in great detail with less important aspects only being considered *if* they impact on the central issues. Several options for action will then be generated and the pros and cons weighed-up, where possible utilising a community of practice comprising of other mountain leaders. Decision making in this sense is much a case of 'homing in' on a solution and then checking by moving from general or broad concepts to more focussed and specific issues.

From the perspective of individualised practice, these options will, of course, need to account for the range of factors already identified pertaining to motivations, skill level of the participant(s), etcetera, and so the mountain leader will need to be aware of how these may impact on the activity. An individual motivated to reach a summit will have to be accommodated within a group that may also include individuals who want to find a Snowdon lily. A good understanding of fundamental 'ologies' (e.g. pedagogy, andragogy, psychology, physiology) *and* how they interact would be considered highly desirable at this stage (Burwitz, Moore, & Wilkinson, 1994). Fortunately, some of this information should be known prior to commencing the activity following consultation with the client, and therefore some planning can take place in advance using this style of thinking. Given sufficient time available, practitioners may even wish to consult on their plan with the client or other colleagues to establish what is most realistic in meeting the desired outcomes and make any refinements as necessary (Collins, Simon, & Carson, 2019). Accordingly, mountain leaders may identify and consider a broad range of aspects of the leadership activity such as predicted changes to weather, anticipated or changing conditions, strategic breaks, the management of energy levels (both physical and psychological), equipment and, equally as crucial, the interactive style and communication with the client(s). The greater the number of clients, length of time in activity, variability of the terrain etcetera, the more complicated this task becomes. With this cognitive structure (or mental model) in place, however, the mountain leader is afforded greater ease in their ability to adapt the process in relation to this, or another, plan to achieve the intended outcomes. Being aware of multiple possible actions in advance, through the planning process, and the change in situation(s) that would deem each appropriate, makes CDM in practice far more manageable. A recent study has revealed that adventure sport coaches build moments into their plans, or take opportunities as they arrive, to make decisions. This is achieved through manipulation of the task schedule (e.g. selecting a less arduous section of route having identified fatigue within the

group) or participant interaction (e.g. working in pairs within a group); the result of these manipulations being a temporary reduction in on-task mental load for the coach (Collins & Collins, 2015). Ultimately, practitioners must account for integrating the time required to think things through and a safe location to do it in. Importantly, the structured planning process provides a basis to evaluate progress and largely know if, what and how any adjustments to pedagogical practices or techniques need to be introduced.

Equally, however, there will be circumstances during the activity when a mountain leader needs to make decisions within much shorter timeframes, with less comprehensive information available or when pressured by emotions or the environment. In other words, they may not always have the luxury of time to investigate, consult, audit and deliberate. For instance, the group may face unexpected challenges such as an ice-covered path on a sheltered slope aspect in early spring. Decisions under these situations will, therefore, benefit from processes that are much faster or intuitive and maybe better described as 'naturalistic decision making' (NDM; Klein, 1998), or using 'skilled intuition'. Decisions made using this style are recognised as being more automatic or subconscious in nature and rely less heavily on cognitive resources. It certainly makes sense that an alternative process to CDM is used sometimes to avoid mental fatigue amongst mountain leaders at the very least. For example, the generation of a set of heuristics. As such, the PJDM approach can be understood in terms of needing to deploy an appropriate balance of decision making styles at different times. During pre- and post-activity experience, CDM will be used to a greater extent than NDM (e.g. during debriefs) in planning for and checking progress against longer-term outcomes or goals, whereas the prevalence of NDM will be at its most during the activity, often in response to or when dealing with short-term challenges, ambiguous information and environmental pressures.

Notably within the field of intuition research, two processes have been proposed by which fast and pressured decisions are actually made. Recognition primed decision making is explained following previous experience within an environment or situation (Klein, Calderwood, & MacGregor, 1989). Facilitated by an awareness of the situation and its demands, important and familiar cues are firstly identified and associated with a previous experience using an analytic processes akin to CDM, which, in turn, enables fast 'intuitive' access to knowledge stored within long-term memory (Kahneman & Klein, 2009). In contrast, the notion of heuristics and biases (Tversky & Kahneman, 1971) is understood to support fast decision making through use of simple rules of thumb, either passed down as an aspect of 'coaching craft' (Chow & Knudson, 2011) or developed through reflection on the decision maker's own experiences. Unfortunately, use of the latter heuristics and biases approach is less likely to reliably resolve complex or novel problems *if* the rule is oversimplified to the extent that meaningful information about the context or outcomes are neglected (Tversky & Kahneman, 1974) or the decision maker has a narrow experience to draw from. Furthermore, application of this approach could possibly result in fatal consequences within the outdoor domain. When such a rule of thumb is misused, it can be said to result in a heuristic trap within the decision making processes and, pertinently for our purpose here, *have* been reported within the mountain context (McCammon, 2004). Whether the decision is recognition primed or heuristically driven, when used effectively, these processes enable informed actions to be delivered during the activity with greater immediacy and fluency.

Thinking skills to assist the PJDM Process

In implementing the PJDM approach, there is a clear need for an underpinning process and mountain leaders will gain much advantage from applying structured higher-order thinking skills. Indeed, these skills are what enable the leader to effectively exercise their knowledge; or in other words, they facilitate effective judgment and decision making skill. Accordingly, the mountain leader will use 'macro' (overarching) cognition during the pre-planning stage to drive the process of design and implementation of the activity. This will entail a projection of future progress towards achieving the desired goal, including: the nature of progress (e.g. ups and downs), what challenges are likely to

be faced (i.e. the situational demands; Abraham & Collins, 2011) including how these can be overcome and what can be done to exploit various factors (e.g. weather, conditions, personalities, meal breaks, etc.). When these are understood and contextualised by the mountain leader, it provides a sense of the 'big picture' and, therefore an indication of the information necessary to be used from a stored library of knowledge. Importantly, the ability to generate these multiple options and their degree of appropriateness for the activity very much depends on the mountain leader's level of experience and situational knowledge (Collins, Collins, & Carson, 2016).

In enacting the necessary flexibility and adaptability, the mountain leader will deploy another high-order thinking skill, *metacognition*; defined here as 'knowledge about and regulation of one's cognitive activities in learning processes' (Veenman, Van Hout-Wolters, & Afflerbach, 2006, p. 3). In short, metacognitive skill refers to one's knowledge for regulating their problem-solving and learning activities. As such, and based on the CDM process described during the pre-planning stage, a mountain leader may ensure their actions are rationally derived, as provided through structures such as

- 'I have decided to ... [ascend the north ridge]'
- 'Because ... [this provides good views and exciting terrain]'
- 'But I considered these options ... [the eastern gully and the walking path]'
- 'And would have taken this alternative if the circumstances were changed to ... [higher winds and poorer visibility]'
- 'I will check my decision in X months [or at X time] and, if I was right, would expect to see ... [my group happy and communicating with each other throughout the journey]'. (Carson & Collins, 2017, p. 199)

In knowing that alternatives need considering and evaluating, this protects against the unquestionable use of 'recipe approaches' that are reported by peers to have worked for them in a particular (but not always the same) context, or the risk of falling into a heuristic trap.

Additionally, the mountain leader will extend the use of metacognition to during the activity itself, through several ongoing reflective checks or audits (i.e. in-action, on-action/in-context; Collins & Collins, 2015; Schön, 1987). Specifically, these audits serve to monitor the decision making process, resulting in greater internalisation of actions within the decision maker's repertoire, and therefore ability to finely adjust the mental model as necessary. Drawing on data from adventure sport coaches, this process of building a sufficiently broad repertoire of options takes time to embed, as the following quote describes, 'it's applying that decision-making process in lots and lots of different situations over lots and lots of years in my case' (Collins, Collins, et al., 2016, p. 6). Once internalised, however, a more intuitive style of effective decision making is made possible.

Despite the CDM style being (perhaps) the most obvious mode for metacognitive activity in auditing decisions made, research now identifies the nesting (or blending; Kahneman & Klein, 2009) of these decision making styles across the entire planning, delivery and auditing process involved with the activity that leads to success. Recent data from adventure sport and rugby coaches demonstrate synergistic use of the two styles (CDM, NDM) at times when auditing decisions in-action and on-action /in-context as part of a reflective process (Collins, Collins, et al., 2016). While coaches in the study by Collins and colleagues may have deployed a naturalistic process during a critical incident—a result of time pressures and incomplete information available—this was then followed by an audit, characterised by CDM mechanisms (but not exclusively). Specifically, the audit acted as a check or way to make sense of the option they had come to select, as the following quote from a rugby coach explains: 'I decide to do something, say make a substitution, but immediately I'm scanning the decision to see if it feels right' (Collins, Collins, et al., 2016, p. 7). However, auditing was also sometimes performed using the NDM style even when the decision process was the same, as the following adventure sport coach 'described the decisions as needing to "go with your gut" (the primary, let's retreat decision) while asking a rhetorical question of himself "does this feel right"' (p. 7).

Metacognition during the activity is, therefore, not *always* characterized by CDM processes, but still serves the same purpose to be aware of and check one's own thinking (cf. recognition primed decision making).

Finally, metacognition may also be used post-activity when considering the way in which the decision making process was carried out; for instance, to ask whether it was right to go with their gut feeling (a naturalistic process) in that case? It may also be appropriate to reflect (a cognitive, not metacognitive process) upon the original intention and whether these objectives were suitable, realistic or flexible enough in light of unfolding events during the activity itself. Thus, the mountain leader is aware of their thinking which feeds back in a circular fashion into their approach to decision making in the future pre-planning, in-action and on-action/in-context scenarios.

Summary

In summary, we have extended recent work on improving the professional practice of mountain leaders to meet the needs of a specific subset of outdoor adventure, hill walkers and hikers. In doing so, we have exemplified the requirement to understand participation as a personal construct across pre-, during and post-activity periods. Environmentally unclear challenges, where no single best course of action is evident, were also presented and suggested to compound the level of complexity when mountain leaders consider the personal construct alone. Our primary focus was then to provide details on how adaptability and flexibility to meet these challenges could be facilitated to enable greater inclusivity within the outdoors. We have achieved this by suggesting and unpacking the PJDM approach alongside its requisite planning, reflection skills, macro and metacognition. From our perspective, there is no simple solution to overcoming the complex issues presented. To achieve this goal, better alignment is required between a sophisticated epistemology and the practical delivery; that is, an epistemological chain (Collins, Collins, & Grecic, 2015). Such alignment could be productively supported through the development of appropriate knowledge, practical and decision making skills and quality reflection on the experience by the mountain leaders (Collins, Carson, & Collins, 2016). Exploration of all these features at an organisational and practitioner level would be a welcomed addition to research in this domain.

Note

1. We have chosen to use the term 'adventure sports' as a reflection of the aims and scope of this journal; however, we acknowledge that a range of different terms have been used (e.g. nature and action sports). Collins and Brymer (2020) provide an initial attempt to unpick the messiness of this myriad of terminology.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

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