

Article

Para-adventure: A hyper-dynamic problem for the inclusive coach

Collins, L., Simon, S., and Carson, H.J.

Available at <http://clock.uclan.ac.uk/23506/>

Collins, L. ORCID: 0000-0002-7478-1140, Simon, S., and Carson, H.J. ORCID: 0000-0002-3785-606X (2019) Para-adventure: A hyper-dynamic problem for the inclusive coach. Sport in Society, 22 (7). pp. 1165-1182. ISSN 1743-0437

It is advisable to refer to the publisher's version if you intend to cite from the work.

<http://dx.doi.org/10.1080/17430437.2018.1504776>

For more information about UCLan's research in this area go to <http://www.uclan.ac.uk/researchgroups/> and search for <name of research Group>.

For information about Research generally at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the <http://clock.uclan.ac.uk/policies/>

Para-Adventure: A Hyper-Dynamic Problem for the Inclusive Coach

Loel Collins*, Scott Simon and Howie J. Carson

Institute for Coaching and Performance, University of Central Lancashire, Preston, United Kingdom

*Corresponding Author: Loel Collins

Institute for Coaching and Performance, University of Central Lancashire, Preston, UK, PR1 2HE. Email: LCollins2@uclan.ac.uk, ORCID ID: 0000-0002-7478-1140

Scott Simon: Institute for Coaching and Performance, University of Central Lancashire, Preston, UK, PR1 2HE. Email: SSimon1@uclan.ac.uk

Howie J. Carson: Institute for Coaching and Performance, University of Central Lancashire, Preston, UK, PR1 2HE. Email: HCarson1@uclan.ac.uk, ORCID ID: 0000-0002-3785-606X

Para-Adventure: A Hyper-Dynamic Problem for the Inclusive Coach

Recent research has recognized sports coaching as complex, chaotic, and cognitively taxing for coaches. Against this backdrop, the present paper explores challenges faced by high-level coaches working with disabled performers. Specifically, it seeks to understand how coaches create mental models of performance in adventure sports and para-canoe. Five coaches were purposively sampled and underwent a semi-structured interview. A thematic analysis revealed *conceptualizing the mental model* as being mechanically-related for all and as including a social construction within the para-canoe coaches. *Reflection* on the coaching process and on personal characteristics were perceived as important to individualized inclusive coaching. Coach training should particularly emphasize the need for critical judgment and decision making skills within a similarly oriented social structure of coaches and support staff where applicable.

Keywords: adaptive coaching; adventure sports; disability; inclusivity; paralympic sport; para-canoe

1 **Introduction**

2 In recent years disability sport has become a growing element within the broad aim of
3 greater social inclusion (Sport England 2017, European Commission 2011). Two aspects of
4 inclusion that are pertinent to the scope of this paper are the Paralympic movement and
5 inclusive practice in adventure sports. The Paralympics in particular has emerged as the
6 second largest global sporting event (Leprêtre et al. 2016, Purdue and Howe 2012) with 176
7 countries competing in the Rio 2016 games. Additionally, inclusive adventure has become
8 an aspect of adventure sports coaching practice (Paul 2010). If the goals of inclusion within
9 these contexts are to be sustained, however, it is important to understand how systems,
10 structures, and the stakeholders involved function to deliver a proficient service. Indeed,
11 such evaluations offer the opportunity to assess and address issues such as workforce skills,
12 efficiency, and attitudes, whilst concurrently providing insight into human psychology under
13 novel constraints. Specifically, this novelty arises partly from the reality of personnel
14 transferring their services from other traditional sport coaching practices. Nowhere is a need
15 for *flexibility* and *adaptability* more apparent than within the already complex job of the
16 coach. For some experienced coaches, at least, working with disabled participants is a highly
17 novel situation (Taylor et al. 2015). Accordingly, there is a need to understand and
18 conceptualize the nature and management of challenges faced by coaches working with
19 disabled participants.

20 As identified by previous studies (Cotterill and Discombe 2016, Harvey, Lyle, and
21 Muir 2015), the acquisition and implementation of expert practice within dynamic,
22 sometimes even hyper-dynamic, environments relies on the coach's ability to create diverse
23 knowledge representations, or *mental models*, that aim to satisfy performer's needs. In
24 constructing a mental model, coaches will seek to understand important kinematic and
25 biomechanical patterns which must be personalized for that individual based on a more

26 generic *technical template*. Consequently, these mental models inform the coaching
27 decisions and actions required (Belling, Suss, and Ward 2015, Collins and Collins 2016b,
28 Collins, Carson, and Collins 2016). High coaching efficacy would, therefore, result in a
29 greater ability to create different mental models according to the various performer
30 characteristics, and so managing this complexity should be recognized as a hallmark of expert
31 practice (Hatano and Inagaki 1986). Frequent activation of these mental models—or at least
32 of the most important factors for performance—increases their establishment within long-
33 term memory (Carson and Collins 2016). As such, a more vivid, robust, and accessible
34 mental model of performance is available, making knowledge retrieval of these aspects
35 faster, more consistent and efficient (Zhou et al. 2018). In practical terms, this is
36 demonstrated by the experienced coaches knowing what they should, or at least *think* they
37 should, be attending to.

38 However, what has not yet been addressed are the challenges and processes
39 undertaken when a coach with an already existing and well-established mental model for
40 performance (no matter how diverse it is) must adapt outside of these parameters to generate
41 a new mental model which optimizes the technical requirements for a performer. As an
42 example, coaches working in Paralympic or inclusive adventure sport are often able-bodied
43 themselves, highly experienced coaches of able-bodied performers who have “transferred”
44 into this domain without experience of creating clear mental models to cater for the diverse
45 aspects of performers who may have a disability (Taylor et al. 2015). Indeed, this is either
46 because suitably diverse technical templates do not exist for such performers, none have been
47 derived due to the hyper-dynamic nature of the environment, or a combination of both. This
48 may be further limited by a pedagogic shortfall resulting from a lack of education and
49 training. Accordingly, it is important that these processes are sufficiently addressed within
50 the coaches’ current training experiences, influences, and consequently, this may then assist

51 in coaches' ability to effectively address performer needs, create knowledge, adapt technical
52 templates into new mental models, and allow effective and inclusive participation.

53 By focusing on these implications, this paper adopts the perspective that performance
54 development *should* be driven by the functional ability of the performer (Paul 2010). We
55 suggest that the need for adaptability and flexibility to achieve this lies at the heart of good
56 coaching and particularly inclusive coaching. Consequently, in an effort to stimulate
57 research in this area, this paper addresses the nature of challenges faced by coaches within
58 two related professional contexts, adventure sport and para-canoe, working with disabled
59 performers, specifically in terms of how the technical templates might be adapted and
60 understood, forming a bespoke mental model for a given performer. For clarity, we have
61 examined the practice of paddle-sport coaches working in complex environments and with
62 disabled performers; that is, those with “physical or mental impairments which have a
63 substantial and long-term adverse effect on their abilities to undertake day-to-day activities”
64 (Disability Discrimination Act 1995). Accordingly, in attempting to develop the paucity of
65 information within adventure and disability sport, this study has deliberately sought out
66 coaches working in areas in which the use of already existing and appropriate mental models
67 are, at best, nebulous, requiring the coach to further adapt components for performance
68 development. Within other Paralympic sports, for instance jumping (Nolan and Patritti 2008,
69 Nolan, Patritti, and Simpson 2006), seated throwing (Frossard et al. 2007, Frossard, Stolp,
70 and Andrews 2004), running (Ferro, Graupera, and Vera 2002), and wheelchair propulsion
71 (Costa et al. 2009, Goosey and Campbell 1998), research to inform technical templates is
72 much further advanced, making study of the chosen domain particularly interesting. Initially,
73 however, we provide clarification as to both the coaches' role and the working context.

74 ***What is an Adventure Sports Coach?***

75 The adventure sport coaches' role has emerged in response to increased demand for
76 performance development in adventure sport. Collins and Collins (2012) conceptualized
77 adventure sports coaching as an interacting subgroup of traditional coaching practice and
78 outdoor education. Supported by a clear epistemology, adventure sport coaches synergize
79 shared skills across outdoor education, leadership, and coaching, catering for a range of
80 different services, including: performance development, personal development, and
81 experience development (see Collins and Collins 2016b). With a frequent focus on
82 individualized development (e.g., motoric, cognitive, experiential, and psychological), their
83 aim is to enable *independent* participation in adventure sport, or in adventurous contexts. In
84 doing so, progress is often governed by the participants themselves rather than benchmarks
85 set by high-level performance per se (i.e., the goal of greater adventure rather than faster,
86 stronger, further, higher, etc. outcomes; Jones and Wallace 2005). Accordingly, the
87 adventure sports coach has a broad role in utilizing adventure for social gains, and in doing so
88 has encompassed disability sport. Such an approach when working with performers who
89 have a disability extends the personal construct of adventure and supports the development of
90 independence in the performer.

91 Finally, because adventure sport coaching practice encompasses a multiplicity of
92 combined roles and diversity of function, there is high demand to exercise effective
93 management of not only oneself but also of the performer(s) (Collins and Collins 2013,
94 2016a). The adventure sports coaches draw on a wide combination of skills, such as risk
95 management, risk–benefit exploitation, personal ability, pedagogic skills, leadership skills,
96 domain-specific declarative knowledge, and technical skill in order to fulfil their complex
97 and challenging role.

98 ***What is a Para-Canoe Coach?***

99 Evolving from Olympic canoe sprint disciplines, para-canoe is a recent evolution
100 within paddle-sport, debuting in the Rio 2016 Paralympic games. Para-canoe coaches
101 therefore, by necessity (at least initially), have transferred from Olympic canoe disciplines
102 directly into para-sport (Taylor et al. 2015). Para-canoe athletes compete in one of three
103 classifications depending on their level of function (International Canoe Federation 2016),
104 with the ultimate outcome of achieving global success and winning gold medals. Like the
105 adventure sports coaches, the para-canoe coaches focus on individualized development (e.g.,
106 motoric, cognitive, experiential, and psychological). However, a key distinction between the
107 two is the nature of support provided. From the para-canoe coaches' perspective, outcomes
108 should result in skillful, effective, and interdependent high-level performance; as is the norm
109 within Olympic sports.

110 Para-canoe coaches' practice also requires a multiplicity of roles and diversity of
111 functions, which too creates high cognitive demand within the coaching process (Kaya 2014).
112 Working with aspiring and current Paralympic athletes, the para-canoe coaches draw on a
113 breadth of skills such as pedagogic, leadership, domain-specific declarative knowledge, and
114 technical skill. Additionally, the para-canoe coaches have a range of support personnel
115 available and may have to manage an integrated support team (medicine, sport science,
116 psychologists, etc.) in order to fulfil their likewise complex and challenging role within the
117 performance environment. From this perspective, it is important that the mental model of
118 performance is shared amongst the community of practice, which adds to the operational
119 difficulty involved.

120 In summary, both the adventure sport and the para-canoe coaches share common and
121 complex practical challenges, which, we contend, place a high emphasis on the cognitive
122 load to manage the coaching process. However, the adventure sports coaches' situation is
123 somewhat unique, in that the added environmental diversity serves to compound this issue

124 even further (Abraham, Collins, and Martindale 2006, Rynne and Mallett 2012, Miller and
125 Rollnick 2012, Collins and Collins 2016b). Taking these factors together, therefore, what
126 seems to be crucial for success is the coach's ability to either adapt an existing mental model
127 for performance or generate a novel one where none currently exists (Carson and Collins
128 2011). Accordingly, we will now examine in greater depth the cognitive mechanisms that
129 could assist the coach to operate under such circumstances, at least as understood by current
130 literature.

131 ***Managing the Complexity: Professional Judgement and Decision Making***

132 Martindale and Collins (2005, 2007) and Abraham and Collins (2011) originally
133 conceptualized the professional judgement and decision making (PJDM) approach as a
134 synergy of nested decision making over short-, medium-, and long-term timescales to achieve
135 a predefined set of intended, and individualized, outcomes. In outdoor activities, Collins and
136 colleagues (e.g., Collins, Collins, and Carson 2016, Collins, Collins, and Willmott 2016,
137 Collins, Carson, and Collins 2016, Collins and Collins 2015, 2016a, b) conceive PJDM as a
138 graded continuum in which the interaction of logical linear "slower" processes and "faster"
139 naturalistic processes (Kahneman 2011) are differentially integrated, depending on the nature
140 and context of the decision to be made (Cotterill and Discombe 2016, Harvey, Lyle, and Muir
141 2015). Practically, PJDM is developed and deployed through in-action, on-action, and on-
142 action/in-context reflections, which are underpinned by a metacognitive ability (Collins,
143 Carson, and Collins 2016). Adaptability and flexibility is facilitated by generating,
144 contextualizing, critically considering, and managing alternative options throughout the
145 process. A focus that is driven by a need to address technical, biomechanical, or pedagogic
146 principles in an individualized way. Thus, the success of a PJDM framework relies on an
147 understanding of a context's situational demands (Abraham and Collins 2011) which

148 combines situational awareness (Flin, O'Connor, and Crichton 2008) and a comprehension of
149 the contextual framework (Ayal et al. 2015, Collins, Carson, and Collins 2016).

150 By necessity, but also frequently by design, the resulting coaching process is flexible
151 and adaptive through the continuously dynamic blend of environmental, individual, and task
152 constraints (Newell 1986), which are manipulated to optimize performers' experience and
153 development. Based on informed observations and questioning, the coach compares the
154 technique of the performer against an intended mental model which is a constructed
155 projection of that movement for each individual (Giblin et al. 2015, Ferdinands 2010,
156 Knudson and Morrison 2002). The myriad of possibilities, evolving from the many possible
157 interactions of constraints, drive the need for adaptability, flexibility, and creativity in the
158 coaching process.

159 In the present case, however, there are a number of potential challenges to the
160 effective deployment of good judgement and decision making skill. For instance, the
161 important information needing attention to create an appropriate mental model maybe unclear
162 to the coach, or difficult to decipher. Consequently, this leads to potential miscalibration on
163 what goals to agree and training environment to select in order to bring the mental model into
164 fruition. Another might be the reliance on information passed down from others' previous
165 experience, including technical templates employed, where this is now invalid due to changes
166 in regulations, technological advances etcetera (Carson and Collins 2011, Chow and Knudson
167 2011) or even societal norms in the treatment of minority populations (Bourdieu 1984).
168 From an educational perspective, there may be a lack of formalized resources to aid coaches
169 in creating, or identifying, the declarative knowledge needing to be adapted for performers
170 (Taylor, Werthner, and Culver 2014). Equally is a lack of training in the skills that allow the
171 coach to derive that knowledge from their own experience (Taylor, Werthner, and Culver
172 2014, Taylor et al. 2015), which in turn potentially limits the coaches ability to optimize their

173 actions by being adaptive and flexible. While these challenges could ultimately lead to
174 suboptimal coaching practice, there is also potential that fear of action, or non-action, may be
175 equally as counterproductive (McDonnell, Hume, and Nolte 2013, Paul 2010). For the
176 moment, however, it would be useful to explore these possibilities in greater detail.

177 Therefore, in this early-stage investigation we ask the following questions: (a) what is
178 the nature of the challenges faced by para-canoe and adventure sports coaches working in
179 complex environments with performers who have a disability? and, (b) how might the mental
180 model for performance be derived?

181 Method

182 Participants

183 Participants were five British paddle-sport coaches from both adventure sport ($n = 2$;
184 $M_{age} = 37$ years ± 5) and Para-sport ($n = 3$; $M_{age} = 43.3$ years ± 9) domains. No disability or
185 para-canoe specific qualification is available from the National Governing Body (British
186 Canoeing), therefore all participants were qualified within able bodied paddle-sport
187 disciplines although currently working in disability/para-sport. To ensure a sufficient level of
188 domain expertise, experience, and inherent quality in terms of participants' self-reflective
189 ability, purposive sampling was employed based on the following criteria: (1) a minimum of
190 5 years' coaching experience since senior accreditation within paddle-sport (adventure sport
191 coaches; $M = 10$ years, para-canoe coaches; $M = 15$ years), (2) currently working within
192 disability paddle-sport with internationally-competitive and/or higher (e.g.,
193 professional/premiership) performers and/or hold the highest level of comparable coaching
194 qualification within their respective sport, and (3) have a willingness to discuss their
195 professional practice. Coaches were deliberately chosen due to the complex nature of their
196 roles and the environments in which they worked with disabled performers. A summary of
197 participating coaches and their experience can be found in Table 1.

198

199

****Table 1 near here****

200

201 At the current stage of investigation, the authors acknowledge the potential limitations
202 associated with such a small sample size; however, this is as a direct result of there being
203 limited coaching roles currently within para and inclusive paddle-sport. The coaches were
204 recruited through personal contact with the research team; the corresponding and second
205 author here being qualified and active practitioners within these two respective high-level
206 sporting domains. This study was carried out with the approval of the university's ethics
207 committee and informed consent from all participants was provided prior to data collection,
208 in accordance with the Declaration of Helsinki.

209 **Procedure**

210 Reflecting the high status of participants, a deliberately open, semi-structured
211 qualitative approach was utilized to encourage a breadth and richness of interview response.
212 Specifically, semi-structured interviews were conducted with each coach in a quiet, private
213 location, and at a time convenient to them. Participants received an information sheet by
214 email at least 1 week prior to interview and, after consenting, the interview commenced by
215 flexibly covering the lines of questioning shown in Table 2. In brief, the interview guide
216 asked participants to recall and evaluate coaching episodes. Probes were deployed where
217 necessary to gain additional information relating to interesting/important responses, to check
218 ideas against emerging literature and concepts, and to encourage participants to recall and
219 evaluate coaching episodes as broadly as possible, thus ensuring sufficient depth of response
220 across all participants. In designing the questions, we were informed and guided by the work
221 of Crandall and Getchell-Reiter (1993), whose application of the critical decision method to
222 nursing incidents in critical care offered a strong template to exploring professional contexts

223 requiring similar adaptive characteristics. Furthermore, this approach has been utilized in
224 similar studies of adventure sports coaches (Collins, Collins, and Carson 2016). The
225 decision-making process and the challenges were explored more generally, as too were the
226 underpinning philosophies of the coach, their perceived skills and attributes.

227

228 ****Table 2 near here****

229

230 The second author conducted the interviews and initial analysis of transcripts. As
231 someone who is highly experienced in this particular field—holding Level 5 British Canoe
232 Union coaching awards in two disciplines, the UKCC Level 4 Certificate in paddle-sport,
233 International Para-Canoe Classifier status, and having attended European, World, and
234 Paralympic Games in support of Para-canoe, the researcher was able to question, probe, and
235 interpret responses with a degree of authority. The first researcher has 30 years of experience
236 as an adventure sports coach at National Centers within the United Kingdom, is a coach
237 educator, and holds Level 5 British Canoe Union coaching awards in four disciplines. The
238 third author is an Advanced PGA Professional golf coach and BASES Sport and Exercise
239 Scientist, and also has a high degree of understanding of performance environments. Overall,
240 interviews lasted between 35–45 mins. Data were recorded using a Dictaphone and securely
241 stored electronically in mp3 file format.

242 **Data Processing and Analysis**

243 Following the guidance provided by Aronson (1995) and Braun and Clarke (2006),
244 data were analyzed using a thematic analysis. Accordingly, interviews were first transcribed
245 verbatim, read, checked and corrected against the recorded interview, and then each
246 transcription was actively re-read several times prior to fully apprehending the essential
247 features (Sandelowski 1995) to assist in a more complete analysis. General impressions of

248 these data were written in note form and shared between the two researchers conducting the
249 analysis (first and second authors), highlighting any similarities and differences. Secondly,
250 driven by an analytic interest in the complexity of the processes, initial coding of response
251 data was applied to each transcript; thus, formally identifying relevant and similar extracts.
252 Thirdly, data codes were collated into hierarchically-ordered themes based on relationships
253 and common features. Within a fourth phase of analysis, these themes were subjected to
254 review and further refinement. A meeting was held between the two researchers to discuss
255 and compare the analysis. The principal aim was to check for a shared understanding and
256 interpretation of data and, therefore, the emerging themes as a whole dataset. This process
257 enabled themes to be combined and broken down, as well as the identification of new themes.
258 Importantly, the emergence of themes at any point during the analysis did not depend on the
259 prevalence of a code, but rather, on what the theme revealed about the complexity of the
260 observation process. Finally, again as a co-operative process, the three researchers defined
261 themes according to the essence of data codes within and how these might be perceived in
262 relation to other existing themes.

263 In addition to the steps outlined above to ensure inter-coder agreement, the question
264 of trustworthiness was addressed through use of an independent researcher (third author),
265 who was not involved in the interviewing or initial coding process, independently coding a
266 random sample of the transcripts (80%) to guard against mis-interpretation and researcher
267 subjectivity (Morrow 2005). Indeed, this was seen as particularly important due to the
268 study's inherently low sample size. Data were coded against the pre-agreed themes and
269 assessed for the level of agreement. Any disagreements regarding these differences in codes
270 were discussed until a consensus was reached.

271

Results and Discussion

272 In attempting to explore the nature of challenges faced and how the mental models are
273 derived, analysis identified 499 raw data codes which were organized into 13 lower-order
274 themes. Lower-order themes were subsequently grouped into four mid-order themes. These
275 were collated into 2 higher-order themes as identified in Table 3. We have provided
276 frequencies of lower-order themes discussed by each coach and have used quotes in the
277 discussion to demonstrate the depth and richness found within these data. For clarity and
278 confidentiality, coaches are identified numerically (para-canoe coaches as 1–3 and adventure
279 sports coaches as 4–5). Higher-order themes are now presented and considered as reflecting
280 the structure in Table 3.

281

282 ****Table 3 near here****

283

284 **Conceptualizing the Mental Model**

285 In conceptualizing a mental model, it is perhaps unsurprising that coaches discussed
286 the task of realizing the desired mechanics involved. Notably, coaches emphasized that they
287 wanted to maintain the same outcomes with disabled performers when compared to their
288 previous experiences coaching able-bodied performers. As the following quotes explain:

289 Within para you are still looking for the same things. I want to make the connection,
290 lock the blade, move the boat past the blade as best I can. OK, this is what it looks
291 like for an able-bodied paddler, if I take out their legs this is what they do. (Coach 3)

292

293 You kind of learn the rules that apply [from able to disabled], you are looking at
294 minimizing dampening and maximizing connectivity as a rule. That's quite easy to
295 measure. (Coach 5)

296

297 Despite the outcomes being similar, the need for innovation on the coach's behalf was
298 apparent. Coach 5 described how consideration of a performer's disability led to the use of
299 modified equipment as a means of minimizing the demand on the performer:

300 I dealt with a participant last year who expressed she had physical difficulties. My
301 initial thoughts were 'let's try and get the boat more stable and easier to paddle and
302 something that maybe wouldn't be as much of an issue if it capsized' for example.

303 That led me towards sit on tops¹, certainly something I hadn't done previously to that,
304 understanding how kit needs to be adapted potentially is important.

305

306 However, the extent of innovation differed depending on the nature of the performer's
307 disability. Consequently, mental models were easier to construct for some than others, as
308 Coach 1 explains:

309 Understanding the functional limitations of the athlete. Then striving towards
310 minimum dampening and maximum connectivity are the first two rules I would have.

311 I believe that actually the able-bodied model is pretty close for KL3 and KL2. For the
312 KL1² athlete, it's quite a bit different, as soon as you take the rotation out the whole
313 stroke dynamic becomes quite a bit different.

314

315 Coaches typically began with able-bodied technical templates in mind when working with
316 disabled performers. However, as the following account from Coach 1 reveals, efficiency
317 trade-offs were sometimes an accepted part of the decision making process:

¹ A sit on-top is a variant of kayak with a flat hull and open deck that allows ease of access and stability with the paddler literally 'sitting on top' of the kayak. Additionally, sit on-tops are affordable, durable, and allow multiple configurations including seating positions.

² Denotes level of function within para-canoe kayak classification. KL1: Athletes with no or very limited trunk function and no leg function and typically need a special seat with high backrest in the kayak. KL2: Athletes with partial trunk and leg function, able to sit upright in the kayak but might need a special backrest, limited leg movement during paddling. KL3: Athletes with trunk function and partial leg function, able to sit with trunk in forward flexed position in the kayak and able to use at least one leg/prosthesis.

318 I coach a slightly different technical model for the pair of them. [Athlete X] can't use
319 leg drive but is completely balanced left-to-right. I can lock her down at her hip and
320 she has full function above that point. So she's like a slalom technical model to some
321 extent. Whereas [Athlete Y] has also got complications around his core so the whole
322 chain is imbalanced from left-to-right, I use the able-bodied model as it's the same
323 kind of full use of leg drive, full use of everything but I know that some things aren't
324 going to get to the gold standard of the technical model.

325

326 Whether similar to their previous coaching experiences or not, there was general
327 acceptance that "good coaching" needed to focus on the *individual*, as Coach 2 exemplified
328 when saying: "I think you're aware of the [person's] disability but you are coaching the
329 person. You understand how the disability is possibly affecting them but you are coaching
330 the person". Or as Coach 1 put it, "I have worked with a lot of different athletes with
331 disabilities, they are all different even if they look like they have the same disability".

332 As well as understanding the mental model themselves, para-canoe coaches identified
333 the beneficial input provided by their support team colleagues in shaping such a vision. Thus
334 establishing a *shared mental model* of performance. Primarily, these coaches reported
335 consulting on the physical aspects of the performance, either technical or regarding strength
336 and conditioning. For instance, Coach 3 described how involving the team with athlete at
337 this stage could inform the technical developments that were desired:

338 With some of the guys [athletes] I've worked with I'd have the whole team in there
339 [physio, sport scientists, etc.], or part of the team along with me and the athlete, and
340 then between us if there was something I was looking for technically or tactically or
341 physically from the athlete. Then working with them to see me giving them an
342 understanding of what I want from a technical point of view.

343 Coach 2 also expressed that working together alongside the athlete was highly performance-
344 focussed:

345 You know it gives you a framework and it's then working out what's applicable,
346 what's not, what could change in that framework? What's going to work for that
347 individual? I think it comes back to that team of people including the athlete in that
348 team as well, what's going to work for them so that they can maximize their
349 performance.

350 Reflecting attitudes in other high performance sports, Coach 3 expanded his earlier comment
351 by going one step further, he utilized the support team to know how much he could challenge
352 the athlete during their technical development, as he explained:

353 Maybe challenge that [performance outcome] and get a little bit further than that
354 based on what I have seen or what I know [technical template observation], because I
355 have spoken to the strength and conditioning coach and physio and I know there is
356 probably a little bit more there [physiologically] than what she [the athlete] thinks.

357

358 In contrast, however, the adventure sport coaches expressed a much more isolated,
359 lonely experience of the process, as Coach 5 explains when reflecting back on a previous
360 experience with a performer: "I'd have loved to have had more, to seek mentoring
361 opportunities, don't try to do it all on your own, it was a painfully long process to gather it
362 myself". Para-canoe Coach 3 emphasized this difference by comparing his practice before
363 having joined a para-canoe community: "I have been very isolated as a coach before being in
364 that group, and the wider group in Nottingham it all makes you think!".

365 Based on these data the need for adaptability in coaching practice appears clear and
366 consistent with previous studies documenting this feature as an important characteristic (e.g.,
367 in mountaineering; Collins et al. 2018). However, this did not mean that coaches were

368 unable to utilize knowledge already gained from coaching able-bodied performers; primarily
369 due to the fact that not *every* movement within the mental model needed adapting. In fact,
370 for some athletes coaches did not change much at all within the para-canoe setting. From a
371 practical perspective, it is interesting to notice an important difference between para-canoe
372 and adventure sport contexts in this regard and what implications this might have on each
373 coach's scope of innovation. Take for example the sit on-tops employed by an adventure
374 sport coach. More generally, equipment in para-canoe competitions will be regulated to meet
375 classification requirements (ICF 2017) whereas, in adventure sport its use is dependent on
376 safety and performer needs as judged to be necessary for development by the coach. As
377 such, in a para-canoe context the coaching decisions in training may be more highly directed
378 by constraints imposed during competition, whereas the innovation afforded in adventure
379 sport can be much greater due to an omission of regulation governing equipment. In other
380 words, while the technical templates were often adapted for the performer in para-canoe, it
381 *can* be the case that the performer and their equipment are adapted to generate closer
382 alignment with a more commonly employed technical template in adventure sport. In either
383 case, however, adaptations were reportedly underpinned by individual performer differences.
384 Such evidence is certainly supported by fundamental research suggesting the need for
385 consideration of performer's predispositions and capabilities, accepting the individual as the
386 unit of analysis when it comes to development beyond initial learning (Kostrubiec et al.
387 2012). Consequently, a narrower set of technical aspects become perhaps more anticipated
388 with experience and accommodated by the coach while other, more universal principles of
389 movement remain preferentially fixed in the coach's mental model.

390 Furthermore, the differing roles and contexts of para-canoe and adventure sport
391 coaches did emerge as factors that may influence development of the mental model.
392 Specifically, the para-canoe coaches operate in a collaborative community of practice that

393 encompassed the support staff for the athlete (Stoszkowski and Collins 2014, Wenger and
394 Snyder 2000). Consequently para-canoe coaches have a clear demand and need to establish a
395 shared model and understanding across the support team (Collins and Hill 2016). Of course,
396 not only must this model be shared, but also consistently promoted and applied (i.e.,
397 internalized and governed) by each member once decided upon (cf. Cruickshank and Collins
398 2012, relating to program development for culture change). While there are clear benefits to
399 having an extended network of expertise available, this too increases the potential risk for
400 miscommunication, confusion, and frustration amongst members and, more importantly, the
401 athlete. As such, the para-canoe coaches provide an explicit managerial role within the group
402 when compared to adventure sport coaches (cf. Collins and Collins 2012), which represents a
403 potential challenge for those transitioning into such environments. Involving the athlete in
404 developing a mental model, common to both adventure sport and para-canoe coaches, is
405 inherently sensible by the coach since they will be less able to empathize with the athlete in
406 terms of executing the movement, or understanding the precise sensations being encoded by
407 the performer (Lang 1979, Carson, Collins, and Jones 2014, Millar et al. 2017). In turn, this
408 involvement would expectedly increase the level of buy-in, motivation, and commitment
409 from the athlete (Butler and Hardy 1992) since the mental model will truly reflect a
410 personally meaningful representation. Accordingly, and consistent across all coaching, this
411 process of contemplation should be viewed as part of any technical intervention, even though
412 no training “action” has been taken at this stage (Prochaska, DiClemente, and Norcross
413 1992).

414 An alternative, but possibly additional, interpretation, is that coaches in this context
415 seek reassurance amongst their peers regarding good professional practice in this novel and
416 less familiar context. This added social dimension of work with disabled athletes (see Paul
417 2010) primarily concerns weighing up options with peers to determine what actions are

418 within acceptable levels of risk. Indeed, this uncertainty may reflect the (relatively) early
419 stage of coaching development in para-canoe and the very small number of adventure sport
420 coaches working in this context. In conceptualizing the mental model as either an adventure
421 sport or para-canoe coach, these recognizable PJDM processes reflect a distinct separation
422 from normative behaviors within traditional coaching contexts, are more congruent with the
423 expertise approach (vs. competency approach) advocated by Collins et al. (2015), and
424 indicative towards effective deployment of informal socially constructed coach knowledge
425 through critical discussion and being open-minded (Stoszowski and Collins 2016).

426 **Reflection**

427 Crucial to creating these mental models for performance was the coaches' use of
428 reflection both to the coaching process and to themselves (i.e., a meta-reflection). Taking a
429 macro view towards their practice, coaches suggested the need for a more considered,
430 deliberative approach in-action to adapt within this context, as Coach 4 suggests when
431 looking back on many years of experience:

432 If you had asked me that 10 years ago my process might have been 'let's, make a plan
433 . . . and we'll do that as opposed to having to spend the first hour or maybe even up to
434 half a day observing where they're at'. Previously I would have just been 'this is
435 what we're doing' and just doing it without much thought, adapting, and changing,
436 really. That's certainly evolved over time as well, I think my understanding of how
437 long to observe for has adapted over time.

438

439 Coach 5 supported this view, elaborating on the novelty of the coaching context as being a
440 reason for needing a more systematic approach:

441 I would be a very holistic observer, I could quickly technical tactically pinpoint where
442 I want to go based on my experiences. With things I am not so familiar with or not do

443 as often, I definitely have a huge amount more systems I go through, I guess with the
444 folks with the disability I probably go more systematic.

445

446 Despite participants' high coaching status, this did not mean that coaches were always
447 successful in achieving their desired outcomes. In fact, previous errors were seen by Coach 5
448 as an important underpinning factor to enabling his ability to coach inclusively:

449 I needed to have trial and errors. I needed to have got it wrong, to reflect on, I needed
450 all those experiences. By having those experiences with different organisations and
451 charities has informed the speed that I can get up and running, or how quickly I need
452 to adapt.

453

454 Which was reiterated by Coach 1 in the following: "I'm fortunate to try things in para, I've
455 been working in para since the start. I have 5 years' experience of trying stuff and it not
456 working, trying different things."

457 Echoing similar approaches to constructing the mental model, Coach 1 discussed his
458 pedagogic development, meaning that he is adaptable irrespective of the context:

459 The biggest thing I do differently is in terms of the individualization, in terms of
460 coaching isn't because of the disability. It's actually one of those athletes likes quite
461 logical feedback and the others like emotional-supportive feedback. That's the
462 biggest difference in how I coach the two, I think the disability is a minimal part of
463 that.

464

465 As already identified, coaches reported changes to personal characteristics that were
466 necessary for successful inclusive coaching. In order to problem solve well, Coach 2
467 explained that patience was required:

468 Problem solving and searching wide and far with that problem solving. Patience, the
469 two of them go hand in hand. You have to be willing to try anything and get your
470 athlete to try anything. Encouraging them and supporting them.

471

472 Likewise, Coach 3 emphasised the need for patience, alongside other characteristics such as
473 emotional intelligence:

474 Probably para-coaching you have got to be a little bit more patient. You've got to be
475 empathetic with where they are at, but not to the point where you don't then challenge
476 them. You have to be, have the flexible approach, adaptable approach to sessions
477 when you need to switch and change them, maybe try to be a little bit more innovative
478 if necessary in how you deal with the injury. You've got to be very aware of how
479 much you are pushing them. Whether they are going to break more easily or not.

480

481 Expanding on these qualities, Coach 3 explained how transitioning from an athlete to coach
482 required him to think more critically in terms of coaching style, but also when
483 conceptualizing the mental model: "I was a single blade paddler, prior to that I was in kayak,
484 so my technical templates have come from experience as an athlete" and when prompted:

485 I think I have become more and more aware of what I am, and how I operate and how
486 I come across to people. More self-awareness, that you maybe think when I'm
487 delivering that [technique], you need to switch that a bit for this person [with a
488 disability], to flex that for individuals, not necessarily, before it was probably just one
489 mode.

490

491 Presently, at least since their experiences of inclusive coaching, reflection was
492 employed by these coaches across multiple levels of practice. At a micro level the immediate

518 flexibility, innovation, and creativity, which was facilitated by a sophisticated judgements and
519 decision process. While the para-canoe coaches utilized and managed an extensive support
520 network to allow this, adventure sport coaches lacked the established community of practice
521 and relied on a cycle of experience with reflection and a belief in their own abilities. As such,
522 from a sustainability perspective, training coaching to work within inclusive coaching should
523 particularly emphasize the need for critical judgment and decision making skills within a
524 similarly oriented social structure of coaches and support staff where available.
525

References

- 526
527
528 Abraham, A., and D Collins. 2011. "Taking the next step: Ways forward for coaching
529 science." *Quest* 63 (4): 366–384. doi: 10.1080/00336297.2011.10483687.
- 530 Abraham, A., D Collins., and R Martindale. 2006. "The coaching schematic: Validation
531 through expert coach consensus." *Journal of Sports Sciences* 24 (6): 549–564. doi:
532 10.1080/02640410500189173.
- 533 Act, Disability Discrimination. 1995. Accessed 2nd February 2017.
534 <http://www.legislation.gov.uk/ukpga/1995/50/section/1>.
- 535 Aronson, J. 1995. "A pragmatic view of thematic analysis." *The Qualitative Report* 2 (1): 1–
536 3.
- 537 Ayal, S., Z Rusou., D Zakay., and G Hochman. 2015. "Determinants of judgment and
538 decision making quality: The interplay between information processing style and
539 situational factors." *Frontiers in Psychology* 6 (1088). doi:
540 10.3389/fpsyg.2015.01088.
- 541 Belling, P.K., J Suss., and P Ward. 2015. "Advancing theory and application of cognitive
542 research in sport: Using representative tasks to explain and predict skilled
543 anticipation, decision-making, and option-generation behavior." *Psychology of Sport
544 and Exercise* 16 (Part 1): 45–59. doi: 10.1016/j.psychsport.2014.08.001.
- 545 Bourdieu, P. 1984. *Distinction: A social critique of the judgement of taste*. Translated by R
546 Nice. Cambridge, MA: Harvard University Press.
- 547 Braun, V., and V Clarke. 2006. "Using thematic analysis in psychology." *Qualitative
548 Research in Psychology* 3 (2): 77–101. doi: 10.1191/1478088706qp063oa.
- 549 Butler, R. J., and L. Hardy. 1992. "The performance profile: Theory and application." *The
550 Sport Psychologist* 6: 253–264.

- 551 Carson, H.J., and D Collins. 2011. “Refining and regaining skills in fixation/diversification
552 stage performers: The Five-A Model.” *International Review of Sport and Exercise*
553 *Psychology* 4 (2): 146–167. doi: 10.1080/1750984x.2011.613682.
- 554 Carson, H.J., and D Collins. 2016. “The fourth dimension: A motoric perspective on the
555 anxiety–performance relationship.” *International Review of Sport and Exercise*
556 *Psychology* 9 (1): 1–21. doi: 10.1080/1750984X.2015.1072231.
- 557 Carson, H.J., D Collins., and B Jones. 2014. “A case study of technical change and
558 rehabilitation: Intervention design and interdisciplinary team interaction.”
559 *International Journal of Sport Psychology* 45 (1): 57–78. doi:
560 10.7352/IJSP2014.45.057
- 561 Chow, J.W., and D.V Knudson. 2011. “Use of deterministic models in sports and exercise
562 biomechanics research.” *Sports Biomechanics* 10 (3): 219–233. doi:
563 10.1080/14763141.2011.592212.
- 564 Collins, D., V Burke., A Martindale., and A Cruickshank. 2015. “The illusion of competency
565 versus the desirability of expertise: Seeking a common standard for support
566 professions in sport.” *Sports Medicine* 45 (1): 1–7. doi: 10.1007/s40279-014-0251-1.
- 567 Collins, D., L Collins., and H.J Carson. 2016. ““If it feels right, do it”: Intuitive decision
568 making in a sample of high-level sport coaches.” *Frontiers in Psychology* 7: 504. doi:
569 10.3389/fpsyg.2016.00504.
- 570 Collins, D., and A Hill. 2016. “Shared mental models in sport and refereeing.” In *Shared*
571 *representations: Sensorimotor foundations of social life*, edited by S.D Obhi and E.S
572 Cross, 588–602. Cambridge: Cambridge University Press.
- 573 Collins, D.J., L Collins., and T Willmott. 2016. “Over egging the pudding? Comments on
574 Ojala and Thorpe.” *International Sport Coaching Journal* 3 (1): 90–93. doi:
575 10.1123/iscj.2015-0068.

- 576 Collins, L., H.J Carson., P Amos., and D Collins. 2018. "Examining the perceived value of
577 professional judgment and decision making in mountain leaders in the UK: A mixed-
578 methods investigation." *Journal of Adventure Education and Outdoor Learning* 18
579 (2): 132–147. doi: 10.1080/14729679.2017.1378584.
- 580 Collins, L., H.J Carson., and D Collins. 2016. "Metacognition and professional judgment and
581 decision making in coaching: Importance, application and evaluation." *International*
582 *Sport Coaching Journal* 3 (3): 335–361. doi: 10.1123/iscj.2016-0037.
- 583 Collins, L., and D Collins. 2012. "Conceptualizing the adventure-sports coach." *Journal of*
584 *Adventure Education and Outdoor Learning* 12 (1): 81–93. doi:
585 10.1080/14729679.2011.611283.
- 586 Collins, L., and D Collins. 2013. "Decision making and risk management in adventure sports
587 coaching." *Quest* 65 (1): 72–82. doi: 10.1080/00336297.2012.727373.
- 588 Collins, L., and D Collins. 2015. "Integration of professional judgement and decision-making
589 in high-level adventure sports coaching practice." *Journal of Sports Sciences* 33 (6):
590 622–633. doi: 10.1080/02640414.2014.953980.
- 591 Collins, L., and D Collins. 2016a. "The foci of in-action professional judgement and
592 decision-making in high-level adventure sports coaching practice." *Journal of*
593 *Adventure Education and Outdoor Learning: Advance online publication*. doi:
594 10.1080/14729679.2016.1227717.
- 595 Collins, L., and D Collins. 2016b. "Professional judgement and decision making in the
596 planning process of high level adventure sports coaching practice." *Journal of*
597 *Adventure Education and Outdoor Learning* 16 (3): 256–268. doi:
598 10.1080/14729679.2016.1162182.
- 599 Comission, European. 2011. "Developing the European dimension in sport." [http://eur-](http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011SC0066)
600 [lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011SC0066](http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011SC0066).

- 601 Costa, G.B., M.P Rubio., S.L Belloch., and P.P Soriano. 2009. “Case study: Effect of
602 handrim diameter on performance in a Paralympic wheelchair athlete.” *Adapted*
603 *Physical Activity Quarterly* 26 (4): 352–363. doi: 10.1123/apaq.26.4.352.
- 604 Cotterill, S. T., and R Discombe. 2016. “Enhancing decision-making in sport: Current
605 understanding and future directions.” *Sport and Exercise Psychology Review* 12 (1):
606 54–68.
- 607 Crandall, B., and K Getchell-Reiter. 1993. “Critical decision method: A technique for
608 eliciting concrete assessment indicators from the intuition of NICU nurses.”
609 *Advances in Nursing Science* 16 (1): 42–51.
- 610 Cruickshank, A., and D Collins. 2012. “Culture change in elite sport performance teams:
611 Examining and advancing effectiveness in the new era.” *Journal of Applied Sport*
612 *Psychology* 24 (3): 338–355. doi: 10.1080/10413200.2011.650819.
- 613 England, Sport. 2017. “Why Disability Sport Matters.” Accessed 2nd February.
614 <https://www.sportengland.org/our-work/disability-sport/why-disability-sport-matters/>.
- 615 Federation, International Canoe. 2016. “International para-canoe technical classifiers
616 manual.” Accessed 12th December.
617 http://www.canoeicf.com/sites/default/files/2_2_icf_paracanoe-
618 [kayak_classification_manual_13-03-](http://www.canoeicf.com/sites/default/files/2_2_icf_paracanoe-)
619 [2015.pdf](http://www.canoeicf.com/sites/default/files/2_2_icf_paracanoe-)http://www.canoeicf.com/sites/default/files/2_2_icf_paracanoe-
620 [kayak_classification_manual_13-03-2015.pdf](http://www.canoeicf.com/sites/default/files/2_2_icf_paracanoe-).
- 621 Ferdinands, E.E.D. 2010. “Advanced applications of motion analysis in spofts
622 biomechanics.” XXVIII International Symposium of Biomechanics in Sports,
623 Marquette, MI, USA, July.

- 624 Ferro, A., L Graupera., and P Vera. 2002. “Kinematic and kinetic study of running technique
625 at different high speeds in blind paralympic athletes.” *Caceres Extremadura*: 523–
626 526.
- 627 Flin, R., P O’Connor., and M Crichton. 2008. *Safety at the sharp end: A guide to non-*
628 *technical skills*. Boca Raton, FL: CRC Press.
- 629 Frossard, L., J Smeathers., A O’Riordan., and S Goodman. 2007. “Shot trajectory parameters
630 in gold medal stationary shot-putters during world-class competition.” *Adapted*
631 *Physical Activity Quarterly* 24 (4): 317–331. doi: 10.1123/apaq.24.4.317.
- 632 Frossard, L., S Stolp., and M Andrews. 2004. “Systematic video recording of seated athletes
633 during the shot-put event at the Sydney 2000 Paralympic Games.” *International*
634 *Journal of Performance Analysis in Sport* 4 (1): 40–53. doi:
635 10.1080/24748668.2004.11868290.
- 636 Giblin, G., D Farrow., M Reid., K Ball., and B Abernethy. 2015. “Exploring the kinaesthetic
637 sensitivity of skilled performers for implementing movement instructions.” *Human*
638 *Movement Science* 41: 76–91. doi: 10.1016/j.humov.2015.02.006.
- 639 Goleman, D. 1996. *Emotional intelligence: Why it can matter more than IQ*. London:
640 Bloomsbury.
- 641 Goosey, V.L., and I.G Campbell. 1998. “Pushing economy and propulsion technique of
642 wheelchair racers at three speeds.” *Adapted Physical Activity Quarterly* 15 (1): 36–
643 50. doi: 10.1123/apaq.15.1.36.
- 644 Harvey, S., J.W.B Lyle., and B Muir. 2015. “Naturalistic decision making in high
645 performance team sport coaching.” *International Sport Coaching Journal* 2 (2): 152–
646 168. doi: 10.1123/iscj.2014-0118.

- 647 Hatano, G., and K Inagaki. 1986. "Two courses of expertise." In *Child development and*
648 *education in Japan*, edited by H Stevenson and K Hakuta, 262–272. New York:
649 Freeman.
- 650 ICF. 2017. "ICF Paracanoe competition rules 2017."
651 https://www.canoeicf.com/sites/default/files/icf_paracanoe_rules_2017_0.pdf.
- 652 Jones, R.L., and M Wallace. 2005. "Another bad day at the training ground: Coping with
653 ambiguity in the coaching context." *Sport, Education and Society* 10 (1): 119–134.
654 doi: 10.1080/1357332052000308792.
- 655 Kahneman, D. 2011. *Thinking, fast and slow*. New York, NY: Farrar, Straus and Giroux.
- 656 Kaya, A. 2014. "Decision making by coaches and athletes in sport." *Procedia - Social and*
657 *Behavioral Sciences* 152 (Supplement C): 333–338. doi:
658 10.1016/j.sbspro.2014.09.205.
- 659 Knudson, D.V., and C.S Morrison. 2002. *Qualitative analysis of human movement*.
660 Champaign, Illinois: Human Kinetics.
- 661 Kostrubiec, V., P. G Zanone., A Fuchs., and J. A. S. Kelso. 2012. "Beyond the blank slate:
662 Routes to learning new coordination patterns depend on the intrinsic dynamics of the
663 learner—experimental evidence and theoretical model." *Frontiers in Human*
664 *Neuroscience* 6: 1–14. doi: 10.3389/fnhum.2012.00222.
- 665 Kruger, J., and D Dunning. 1999. "Unskilled and unaware of it: How difficulties recognising
666 one's own incompetence lead to inflated self assessments." *Journal of Personality*
667 *and Social Psychology* 77 (6): 1121–1134.
- 668 Lang, P.J. 1979. "A bio-informational theory of emotional imagery." *Psychophysiology* 16
669 (6): 495–512. doi: 10.1111/j.1469-8986.1979.tb01511.x.
- 670 Leprêtre, P-M., V.L Goosey-Tolfrey., T.W.J Janssen., and C Perret. 2016. "Editorial: Rio,
671 Tokyo Paralympic Games and beyond: How to prepare athletes with motor

- 672 disabilities for peaking.” *Frontiers in Physiology* 7 (497). doi:
673 10.3389/fphys.2016.00497.
- 674 Martindale, A., and D Collins. 2005. “Professional judgment and decision making: The role
675 of intention for impact.” *The Sport Psychologist* 19 (3): 303–317. doi:
676 10.1123/tsp.19.3.303.
- 677 Martindale, A., and D Collins. 2007. “Enhancing the evaluation of effectiveness with
678 professional judgment and decision making.” *The Sport Psychologist* 21 (4): 458–
679 474. doi: 10.1123/tsp.21.4.458.
- 680 McDonnell, L.K., P.A Hume., and V Nolte. 2013. “A deterministic model based on evidence
681 for the associations between kinematic variables and sprint kayak performance.”
682 *Sports Biomechanics* 12 (3): 205–220. doi: 10.1080/14763141.2012.760106.
- 683 Millar, S-K., A.R.H Oldham., I Renshaw., and W.G Hopkins. 2017. “Athlete and coach
684 agreement: Identifying successful performance.” *International Journal of Sports
685 Science & Coaching* 12 (6): 807–813. doi: 10.1177/1747954117738886.
- 686 Miller, W. R., and S Rollnick. 2012. *Motivational interviewing: Helping people change*. New
687 York: Guildford Press.
- 688 Morrow, S.L. 2005. “Quality and trustworthiness in qualitative research in counselling
689 psychology.” *Journal of Counseling Psychology* 52 (2): 250–260. doi: 10.1037/0022-
690 0167.52.2.250.
- 691 Newell, K.M. 1986. “Constraints to the development of coordination.” In *Motor development
692 in children: Aspects of coordination and control*, edited by M.G Wade and H.T.A
693 Whiting, 341–360. Dordrecht, The Netherlands: Martinus Nijhoff.
- 694 Nolan, L., and B.J Patriitti. 2008. “The take-off phase in transtibial amputee high jump.”
695 *Prosthetics and Orthotics International* 32 (2): 160–171.

- 696 Nolan, L., B.L. Patritti., and K.J. Simpson. 2006. "A biomechanical analysis of the long-jump
697 technique of elite female amputee athletes." *Medicine and science in sports and*
698 *exercise* 38 (10): 1829–1835. doi: 10.1249/01.mss.0000230211.60957.2e.
- 699 Paul, J.S. 2010. "Inclusive adventure by design: The development of opportunities in outdoor
700 sport for disabled people through co-ordinated people centred research and
701 development in design and coaching." PhD, Brunel University.
- 702 Prochaska, J.O., Carlo C. DiClemente., and John C. Norcross. 1992. "In search of how
703 people change: Applications to addictive behaviors." *American Psychologist* 47 (9):
704 1102–1114. doi: 10.1037/0003-066x.47.9.1102.
- 705 Purdue, D. E. J., and P. D. Howe. 2012. "See the sport, not the disability: Exploring the
706 Paralympic paradox." *Qualitative Research in Sport, Exercise and Health* 4 (2): 189–
707 205. doi: 10.1080/2159676X.2012.685102.
- 708 Rynne, S. B., and C. J. Mallett. 2012. "Understanding the work and learning of high
709 performance coaches." *Physical Education and Sport Pedagogy* 17 (5): 507-523. doi:
710 10.1080/17408989.2011.621119.
- 711 Sandelowski, M. 1995. "Qualitative analysis: What it is and how to begin." *Research in*
712 *Nursing and Health* 18: 371–375. doi: 10.1002/nur.4770180411.
- 713 Schön, D. 1983. *The reflective practitioner: How professionals think in action*. Aldershot,
714 UK: Ashgate.
- 715 Stoszowski, J., and D Collins. 2014. "Communities of practice, social learning and
716 networks: Exploiting the social side of coach development." *Sport, Education and*
717 *Society* 19 (6): 773–788. doi: 10.1080/13573322.2012.692671.
- 718 Stoszowski, J., and D Collins. 2016. "Sources, topics and use of knowledge by coaches."
719 *Journal of Sports Sciences* 34 (9): 794–802. doi: 10.1080/02640414.2015.1072279.

- 720 Taylor, B., and D Garratt. 2010. "The professionalisation of sports coaching: Relations of
721 power, resistance and compliance." *Sport, Education and Society* 15 (1): 121–139.
722 doi: 10.1080/13573320903461103.
- 723 Taylor, S., P Werthner., D Culver., and B Callary. 2015. "The importance of reflection for
724 coaches in parasport." *Reflective Practice* 16 (2): 269–284. doi:
725 10.1080/14623943.2015.1023274.
- 726 Taylor, S.L., P Werthner., and D Culver. 2014. "A case study of a parasport coach and a life
727 of learning." *International Sport Coaching Journal* 1 (3): 127–138. doi:
728 10.1123/iscj.2013-0005.
- 729 Wenger, E. C., and W. M Snyder. 2000. "Communities of practice: The organizational
730 frontier." *Harvard Business Review* 78 (1): 139–145.
- 731 Zhou, Yun., Sudanthi Wijewickrema., Ioanna Ioannou., James Bailey., Gregor Kennedy.,
732 Debra Nestel., and Stephen O’Leary. 2018. "Do experts practice what they profess?"
733 *PLOS ONE* 13 (1): e0190611. doi: 10.1371/journal.pone.0190611.
734

735 Table 1. *Coach experience and qualification*

Coach	Highest Qualification	Coaching Experience (Years)
1	British Canoeing Level 4	20
2	UKCC Level 3 Certificate. Great Britain Paralympic Programme	10
3	UKCC Level 3 Certificate. Great Britain Paralympic Programme	23
4	UKCC Level 4 Certificate in Paddle-Sport British Canoeing Level 5	22
5	British Canoeing Level 4	10

736

737 Table 3. *Structure of the Thematic Analysis*

Higher-order Theme	Mid-order Theme	Lower-order Theme	Coach 1	Coach 2	Coach 3	Coach 4	Coach 5	
Conceptualizing the mental model	Mechanical features	Individualization	11	6	16	7	7	
		Innovation of technical template	15	15	11	2	2	
Reflection	Sharing the mental model	Performance focus development	3	2	16	2	–	
		Community of practice	1	3	15	–	3	
		Discuss ideas with athlete/performer	15	9	13	3	6	
		Learning from coaching experience	12	13	17	8	27	
	Coaching process	Generating/considering options systematically	20	26	27	5	18	
		Integration of reflection as part of practice	5	3	4	2	–	
		Broader and adaptive coaching repertoire	5	16	19	4	15	
		Learning focussed environment	13	3	10	9	7	
		Personal characteristics	Critical thinking	1	1	1	1	3
			Patience	–	3	1	2	–
Emotional intelligence	5		1	7	1	1		

738

739