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Title	Developing an intelligent body – what does it mean to be physically educated?
Type	Article
URL	https://clock.uclan.ac.uk/id/eprint/40523/
DOI	
Date	2021
Citation	Whall, Richard and Palmer, Clive Alan (2021) Developing an intelligent body – what does it mean to be physically educated? Journal of Qualitative Research in Sports Studies, 15 (1). pp. 77-104. ISSN 1754-2375
Creators	Whall, Richard and Palmer, Clive Alan

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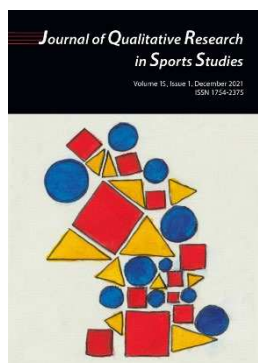
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Published by:
Sport and Wellbeing Press
University of Central Lancashire, Preston, UK.



Journal of Qualitative Research in Sports Studies

Volume 15, Issue 1, December 2021

Developing an intelligent body – what does it mean to be physically educated?

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ISSN: 1754-2375

ISBN: 978-0-9955744-7-2 (163 pages)

JQRSS Article No: 4/5-15-1-2021-PG[100]-155

To cite this article:

Whall, R. and Palmer, C. (2021) Developing an intelligent body – what does it mean to be physically educated?
Journal of Qualitative Research in Sports Studies, 15, 1, 77-104.

Self-archived URL link to this article:

https://www.academia.edu/60947104/Richard_Whall_and_Clive_Palmer_2021_Developing_an_intelligent_body_what_does_it_mean_to_be_physically_educated_Journal_of_Qualitative_Research_in_Sports_Studies_15_1_77_104

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Developing an intelligent body - what does it mean to be physically educated?

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Keywords: *Physical intelligence, learning, phenomenology, perception, senses*

Abstract

This research is ‘in motion’ moving forwards in its investigation about learning through movement, towards the question: ‘what does it mean to be physically educated?’ This article is a mid-way report which describes the ground covered so far and maps the path ahead for the researcher. From rich philosophical territory concerning body-mind, meaning and intelligence, this qualitative inquiry started with questionnaires and is proceeding to physical ‘mobile methods’ – interviews on the move, to explore facets of thinking about intelligence as may be exercised through the body, while a person is exercising. A high degree of researcher reflexivity is a central feature of this work, to grapple with (i) challenging philosophical concepts, (ii) qualitative methodology and (iii) analysing the data in a quest for meaning. As the project has gathered momentum, the researcher’s positionality with these three areas are critiqued, including his own readjustment to what a concept of ‘research’ might be, beyond the shadows which Westernised concepts of ‘science’ have traditionally, and sometimes unhelpfully cast. In closing, it is hoped this grounded philosophical study might inform some reasoning and practices in Physical Education and Outdoor Education to engage the body in learning activities that promote becoming and being, physically educated.

Introduction

This account starts with the researcher’s thoughts, prompted by his curiosity to investigate this topic, which in turn, was a result of his experiences and beliefs for learning through his own physicality (first author). Upon realising that the topic was bigger than him, a practical light was shone down the path of a philosophically grounded inquiry; a conceptual lens and method has been constructed to conduct this research (second author). With reflexivity embedded throughout, in philosophy and research methods, this paper discusses relevant literature about physical intelligence and physical literacy, shares conference posters which communicate the complexity of the task ahead, and builds a story from respondent voice, which are pointing towards initial discoveries from the data. A series of figures help to illustrate the practical application of thought, in this ongoing, applied work.

A gut response: an introduction to the study

All is going well. The research journey has begun. A plan has been devised and approved. Relevant literature is being sought and consumed. Potential participants have been identified and approached. The first (single question) questionnaire has been distributed and responses are beginning to be returned.

'When I think of a physically-intelligent person, I think of the physical literacy definition'.

Great! That's depressing... months of reading, thinking, planning, and this is the first line of my first response. It feels like this has just killed my research, dead in the water. There is nothing new here, physical intelligence is just another interpretation of physical literacy. Or is it? Let's step back and consider this for a while. How else can I make sense of this? This is how just one person, from a Physical Education background, has replied to my question, or has begun their response at least. So, why was this my initial gut reaction? Am I misinterpreting this? Is this really what they believe? Does everyone think like this? Understanding the opinions of a wider cross-section of participants was my intention for this exact reason; not everyone thinks the same.

Let me take another step back. Why am I seeing this in a negative light? Does this actually raise a valid and important point? Isn't this line of thinking partly what triggered my research quest in the first place? Are physical intelligence and physical literacy really the same? Does literacy underpin intelligence maybe? Is an intelligent body a literate one? What do we mean by intelligence? Are intelligence and literacy even related? And how does either fit within the physical domain? Physical literacy is already a hotly debated concept; by philosophers to understand what it actually means (for example see: Ackerman, 1996; Hanna, 2004; Kretchmar, 2018; Young, O'Connor and Alfrey, 2020; Whitehead, 2010, 2013) and by the 'health lobby' who wish to deploy this snappy title *Physical Intelligence* into their own field of physical activity and human development (for example: see national associations for Physical Literacy in the UK, USA, Canada). My gut feeling that led me to begin this study was that there are significant issues within the current conceptualisation,

'...but am I going to bring some clarity, or perhaps just muddy the waters further?'

This short, reflexive narrative highlights just a few of the underpinning philosophical dilemmas I have encountered during my initial research, and some of the key areas requiring deeper exploration. In this paper I intend to demonstrate how, by interweaving reflexivity, data analysis and surveillance of existing literature, I have mapped and navigated these philosophical challenges, developing my understanding of research philosophy and my own positionality, whilst building a conceptual map of physical intelligence as the foundation for the next stages of the research journey, and also demonstrating the potential for breaking new ground.

Reflex responses: establishing aims and objectives

AIMS: Against a background of on-going, world-wide debates about the position, purpose and value of Physical Education (Hyndman and Pill, 2018; Sprake and Walker, 2015; Sellers and Palmer, 2008), the initial aim of my research is to qualitatively explore the notions of physical intelligence and the intelligent body, and their relationship to being and becoming physically educated. Working towards this first aim will allow me to continue my research with the further aim of investigating experiences that can facilitate the development of an intelligent body and, thereafter, to inform practical guidance strategies for practitioners.

With a number of philosophical dilemmas already highlighted, it is important to take time for critical self-reflection, early in, and periodically throughout, the research process to allow me to get to grips with my position as researcher and the potential influence on my research (Attia and Edge, 2017; van Manen, 2017). This is a vital, yet challenging, skill to develop as I take the first steps into the qualitative research field (Barrett, Kajamaa and Johnston, 2020); with many ‘what’s, how’s and why’s’ to reflect upon as I navigate through this project, awareness of which are fundamental to both the quality and credibility of my work (Pool, 2018; Saldana, 2018). For example: Why am I setting out on this adventure? Why do I believe this to be an important question to answer? How can I best seek answers? What is it that makes me so curious about movement, the senses and our physical (human) being? Why have I chosen intelligence as a lens to examine our physical being?

Reflecting on my journey to the start line of this adventure I would have always considered myself as a ‘sporty’ child, capable in a number of sports, able to pick up new skills and techniques quickly and thus, I believed, physically-well-educated. I developed my interest and understanding of all things sport, physical activity and the moving body through my Undergraduate and Postgraduate study of sport and exercise science, going on to apply them during my employment in the health and fitness industry. However, as I transitioned back into education, first as a Primary School teacher and later as lecturer in Higher Education, I began to feel somewhat disconnected both from my physical body - the proverbial bag of bones and muscles transporting my head around, and also from my assuredness that I actually understood what Physical Education was meant to be. (Dunning-Kruger in action?)

Personal reflections at the start of my PhD

I'm at the start line, bouncing around with nervous anticipation. I'm feeling good and raring to go. Physical intelligence here we come! But wait, as I glance again at my watch, waiting for the starter's gun, I'm hit with two sudden thoughts, one after the other, that stop me in my tracks: How did I actually get here? How do I know which is the best route to take?

For every race I've been in before, there has always been a clear route to follow; but not this time! I've got an overall question to explore which gives me some ideas of which maps might be useful. And there are some general themes to follow which may provide potential landmarks. However, I'm equally aware that I don't really know the scale of the map or what many of the features on it are. Suddenly it seems like the craziest of ultra-endurance races; there are no direct competitors (though others have worked, and will continue to work, from the available and expanding maps); I have absolutely no idea where the finish line is (it suddenly feels like a race to find a pot of gold at the end of a rainbow); and again, more deeply than before, I wonder how I managed to be on the start line in the first place. Taking a deep breath helps to bring some calm and deeper thinking to the situation, allowing for some positive self-talk in the face of this seemingly absurd pursuit.

This isn't really the beginning, it's the next stage in a journey I've been on all my life. It's not necessarily about the race, it's about the participation, self-awareness and experiences gained along the way, each of which will allow me to develop, discard or make sense of where I've been in the past. Does it really matter if I never find the pot of gold?

So, what are some of these general areas on the map I want to explore? Why do I want to explore them? Might there be other areas yet to be plotted? Is my compass my question? I look forward to learning how to use it, upgrading it even as I go, learning from the guidance and wisdom of others, meeting new people along the way, each of whom has their own map and compass to follow.

Where have I been before that has led me to this point? What are the significant landmarks that stood out so far? Maybe even more importantly, what have I missed or misunderstood as I've travelled thus far, often with blinkers on, earphones in or head down charging full steam ahead?

Where have I already been: retracing my footsteps?

Where have I been before that has led me to this point? What are the significant landmarks that have stood out so far? Maybe even more importantly, what have I missed or misunderstood as I've travelled thus far, often with blinkers on, earphones in or head down, charging full steam ahead?

Throughout my childhood, adolescence and early adult years I've always remained fit and active through both work and play. Indeed, I would regard myself as being physically well-educated, but why? I certainly enjoyed Physical Education at school, but probably learnt more during breaktimes playing one of many variations of tag that were in vogue (or allowed) at the time, or playing

football with a tennis ball, tin can or rolled up sock. I also have many fond memories of days spent outside playing football or cricket with friends, often regardless of the weather, riding my bike around country lanes, climbing trees, jumping challenges off the swings or wild games of tag across the entire park.

There were also activities, however, in which I did not excel or enjoy participation – swimming and dance being prime examples. Why wasn't I very good at these? Is it lack of enjoyment or lack of ability? Was it due to lack of opportunity or experience? Lack of understanding or lack of motivation? Fear of failure or fear of embarrassment? Does it even have to be one of these or could it be that all of these played their own role?

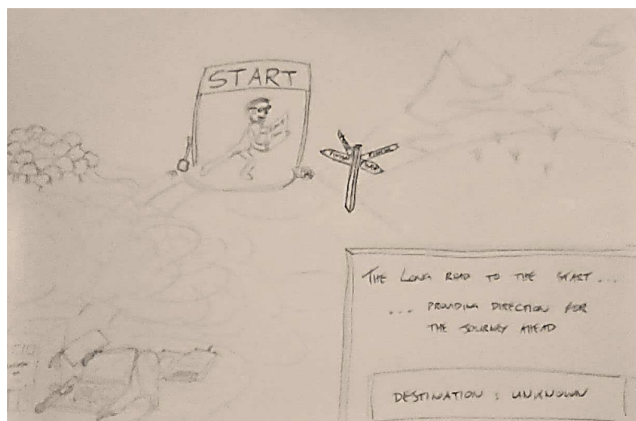
Does being physically educated mean you are physically intelligent? Is physical intelligence all about being 'good' at sport? Or physical activity? Or even movement in general? Another vivid memory I can recall, though I didn't fully appreciate its significance at the time, was of walking through an empty playground early one morning whilst I was a Primary School teacher 5 or 6 years ago. The memory sticks out as although I was indeed 'walking' across the playground I clearly recall feeling, somehow, disconnections within my body – the proverbial bag of muscles and bones transporting my head around. I wasn't injured, tired or sore from any previous physical activity, in fact, I don't clearly remember when the last time I'd been physically active even was. Maybe that was the point? The strange feeling was in my legs, the sound of heavy shoes slapping on to the concrete, the general awkwardness of my gait were all signs that something wasn't quite right. Was my physical intelligence deteriorating from disuse? Is physical intelligence related to both action and perception?

Informal academic study of the physical disciplines started in my early teens, seeking books about training to guide my own footballing development or learn new cricket skills, though I didn't start any formal study until university. With no specific career in mind, just a fascination for sport and more specifically sports science and fitness training, I completed both a taught undergraduate and postgraduate degree in Sport and Exercise Science, delving deeply into the inner workings of the human body and the scientific approach to study. I was introduced to theories taught as fact, reductionist approaches to understanding anatomy and biomechanical principles of movement but rarely, if ever, to philosophers or alternative ways of thinking. It is this that intrigues me so much about this current study. The perceived freedom to explore a concept from multiple angles in any way which in the past was not available to me, is both liberating and laden with anxieties in equal measure. Perhaps taking some time to really get a solid grounding in philosophy will help to alleviate the fear?

Another additional weight I seem to be carrying is my increasing perception of however much I'm learning I'm building a bigger appreciation of how much more there is to know. Is this an example of the Dunning-Kruger in action?

[The Dunning-Kruger effect, in psychology, is a cognitive bias whereby people with limited knowledge or competence in a given intellectual or social domain greatly overestimate their own knowledge or competence in that domain relative to objective criteria or to the performance of their peers or of people in general.]

If you'd asked me as a child what physical intelligence was I'd undoubtedly have been biased by my own favouritism for sports. Journeying on through my time as first, a personal trainer and fitness coach, to becoming a multi-skills practitioner and coach educator opened my eyes to a wider range of movement skills, whilst my more recent forages in Outdoor Education has played a role in broadening my understanding of the importance of the physical environment with which one is engaging. Whilst I've never really before attempted to understand what physical intelligence is, had you asked me at any of these previous stages I'd have been pretty sure of myself. Yet, as I now look back, I can clearly see how my understanding has grown and been influenced by my different experiences. Returning back now to academia has made me realise how little of the whole thing I truly understand. Is this what has stopped me in my tracks? Am I now virtually paralysed by the sheer enormity and complexity of the task of trying to understand the intelligence of the human body? What can I possibly do to direct my next steps?



Furthermore, from my experiences within health and fitness, and more recently in education, it became apparent to me that I may not be the only one with these kinds of feelings at the start of a committing and daunting research challenge. Whilst my descent into a more sedentary, stressful living may have been the instigator of my own physical disconnect (job, family, getting older), what Hanna (2004) defined

as sensory-motor amnesia, it is evident through both research (for example, Foulkes *et al*, 2015 and O'Brien, Belton and Issartel, 2015) and my own observations that poor co-ordination, physical awkwardness and low levels of movement competence are commonplace amongst Primary and Secondary school pupils in the UK. So, why are we, in our modern Western society, seemingly feeling less at home in our bodies? Is physical co-ordination and our sensory-motor awareness a form of physical intelligence? Are our body's becoming less intelligent through a lack of, or inappropriate, use? Could it be the way in which we view, understand and relate to our bodies? Do we view our body's as possessing intelligence? And what role can, and does, Physical Education (PE) play in helping us to sense, connect with, and value our physical intelligence that may allow us to 'live well' both in our body and as a body (alongside many other bodies in society)?

PE often pins it's hopes of enhancing its reputation through claims of its ability to address the growing concerns for health of the nation (Harris, 2018) generally with an over-reliance on sport (Kirk, 2010) and a common goal of guiding pupils to be 'physically active for life' (McEvoy, Heikinaro-Johansson and MacPhail, 2017). But is there, or could there be more to PE than sport and physical activity? Piggini (2020), in recognising the limitations of the traditional health-orientated perceptions of physical activity, suggests a broader view is required, offering his own definition as a starting point for further discussion of physical activity's inherent complexity. Similar concerns have been raised within the medical field, Wallden (2015) for example, illustrating the potential benefits and challenges of moving beyond the simple, reductionist view of the physical human body (as object) and embracing the complex realities of human being. Embarking on a more extensive exploration of the 'physical' in PE, it is hoped that my research can make a contribution to these burgeoning conversations.

OBJECTIVES:

1. To investigate how an intelligent body is recognised, perceived and valued across education, sport and physical activity domains from the perspective of those with significant lived experience. Initial data collection by questionnaire.
2. To complete a concept analysis of physical intelligence utilising reflexivity to plot and probe researcher positionality. Establish a critical review of existing literature to identify distinctive features of an intelligent body and what it means to be or become physically-educated.
3. To utilise the findings from the concept analysis, alongside research into stimulated recall protocols, to formulate individual and focus-group interviews strategies to obtain in-depth information from recruited subjects about their experiences and opinions.

4. Using an interpretive approach to analysis, to identify the experiences that may lead to the development of an intelligent body. The derived narrative will be explored through varying lenses dependent upon the emergent themes.

For example:

- A Practitioner lens
- An Elite Performer lens
- A Developing Performer lens

5. To recommend practical strategies which may have the potential to develop intelligent bodies in and through PE.

Mapping the terrain: an initial literature review

Having identified and reflected upon some of my personal experiences that have led me to the starting line of this research adventure, the next step was to map the terrain I intend to explore, retaining a sense of reflexivity throughout. I will use Williams (1980) dominant-residual-emergent model of change to illustrate some of the existing viewpoints that dominate the landscape, shining a light on some residual features that have lain largely unnoticed and begin to investigate pathways that have recently begun to emerge. Two key landmarks to investigate on my research map are: 1) how well do we ‘know’ the human body, and 2) what is currently known about [physical] intelligence? Additionally, and just as importantly, how did we come to know this?

The nature of both the body and intelligence have featured centrally throughout philosophical and scientific history, though not always together. Indeed, with its roots evident within early Greek philosophy, before flourishing through the work of Descartes and beyond, much discussion has rendered the body an inanimate object and secondary to the mind. Science, and Sports Science in particular, has largely perpetuated the view of ‘mind as the controller over the body’ through machine metaphors (Ryle, 1949), seeking to understand the form and function of each individual part to be fine-tuned for health or performance. To be honest, I unknowingly shared the same views during my initial education and early part of my career when I was fully immersed in the sporting world. Now, however, I feel that something is missing, that there is far more to the body than the overly simplistic body-as-machine metaphors convey. In fact, the dominant, mechanistic views of the human body are, indeed, beginning to be challenged through emerging, more holistic views of human structure and function, such as Myers (2014) anatomy-trains model and recent ‘biotensegrity’ theories of movement (Scarr, 2019).

Unfortunately, the rise of head over heels, also served not only to metaphorically remove mind from body but to elevate homo sapiens out of the animal kingdom

(Ingold, 2004). Consequently, an anthropocentric view has dominated intelligence research, seeking to understand the nature of intelligence and what makes humans uniquely intelligent. Yet, whilst the term ‘intelligence’ is frequently used, the literature is littered with definitions, making intelligence a slippery concept to grasp and potentially irrelevant (Hiser and Francis, 2000; Richardson, 1999; Jensen, 1989). Nonetheless, what is generally agreed upon is that intelligence is a mental phenomenon associated with rational, abstract thinking and problem-solving (Cianciolo and Sternberg, 2004).

In an address to the New York Academy of Medicine nearly 100 years ago, educational philosopher John Dewey argued against the dominant approaches of division and reductionism of the time, stating that ‘I do not know of anything so disastrously affected by the tradition of separation and isolation as is this particular theme of body-mind (Dewey, 1928: 5). Unfortunately, this aspect of Dewey’s work has largely gone unheeded, hidden in the background as the Cartesian mechanistic view ploughed ahead. Whilst there are individuals such as Holst (2013), Jarvis (2005) and Evans (2004) who explicitly reject Cartesian dualism and call for a more embodied approach to education, and PE in particular, PE continues to be dominated by dualistic notions of body as object (Rosenberg, 2019; Sellers and Palmer, 2008).

Though not a new use of the term (Bailey, 2020), Margaret Whitehead is widely considered to have instigated the current Physical Literacy (PL) movement, developing the concept (with the deliberate choice of ‘literacy’ as opposed to ‘educated’, ‘competence’ or ‘mastery’) in an attempt to address the problems of dualism in PE (Whitehead, 2001). Embracing monism as it’s philosophical roots and with a keen focus on how we communicate and interact with the world (Whitehead (2001:130) even hinted initially that PL may be about ‘being able to perceive intelligently and respond appropriately’, PL appeared to be a formidable opponent to dualism. Erroneously however, to me at least, in an attempt to simplify debate, Whitehead (2001:131) made the curious decision to confine her discussions to refer to ‘movement involving larger muscle groups’. At best, this provides a very restricted viewpoint, at worst, it shifts the focus to health as opposed to literacy and becomes completely incongruent with her aim of establishing how we relate physically to the world. So, although PL may go some way towards a more holistic approach to PE, as a concept it is ‘riddled by ambiguities and confusion’ (Bailey, 2020:1). Later iterations of the PL definition have only served to move the concept further down the health path (see figure 1), becoming severed from its philosophical roots as the concept evolved over the last two decades (Young, O’Connor and Alfrey, 2019).

Source	Country of Authors	Definition
Allan, Turnnidge, and Côté (2017)	Canada	'Physically literate individuals maintain a self-awareness that encourages moral behaviour and meaningful connections with others in physical activity contexts.' (p.523)
Aspen Institute (2015)	US	'Physical literacy is the ability, confidence, and desire to be physically active for life.' (p.9)
Castelli <i>et al.</i> (2014)	US	'Physical literacy is a disposition that establishes purposeful physical activity as an integral part of daily living.' (p.95)
Francis <i>et al.</i> (2016)	Canada, US, Netherlands, Australia	'Physical literacy is defined here as the attributes, characteristics, skills and behaviours that are related to the capacity for, and commitment to a healthy, active lifestyle.' (p.214)
Penney and Chandler (2000)	Australia, US	'The knowledge, skills and understanding that are associated with bodily awareness, development and expression, and that underpin participation, development of performance and enjoyment in and out of the wide array of physical activities that feature in modern societies.' (p.80-81)
Richards (2016)	Australia	'Physical Literacy is a lifelong process, that acquisition (competence) of fundamental movement skills is a core component, and that it embraces knowledge, attitudes and motivations that facilitate confident movement.' (p.1)
UK Sports (2002)	UK	'... the 'ABCs' of Agility, Balance, Co-ordination and Speed.' (p.126)

Figure 1: Physical Literacy a slippery concept to define (after Bailey 2020)

Built on the foundations of the body-based work of philosophers such as Merleau-Ponty (2013; originally published in 1945) and, more recently, Dreyfus (2006), in combination with the scientific investigations of perception-action links (Gibson, 1959) and dynamical systems theory (Bernstein, 1967), a growing recognition of the role of the body in cognition has emerged, challenging the hegemony of classic cognitivism (Moe, 2005 and Ziemke, 2003) and opening potential opportunities to reconsider what it means to be physically-educated. Additionally, eminent intelligence researcher Sternberg (2008) highlighted two different holistic views of human intelligence, beyond which he hoped would provide the framework for fruitful dialogue to advance educational practice; namely, Gardner's (1999) theory of multiple intelligence's and his own (1997) theory of successful intelligence, which has more recently matured into adaptive intelligence (Sternberg, 2020).

Based on this initial review of literature, it is evident that intelligence itself is a challenging concept to define and that it may reside in more than just the mind. So, what role does the body play in supporting thinking? Or is the body actually able to think for itself? Is it preferable, or even possible, to think of a separate body and mind? It is clear that I must proceed with caution here, taking note of Light and Clarke's (2021) warning not to shine the spotlight purely on the body and disconnect completely from mind.

First steps on the research journey: a methodological overview

Revisiting my academic and research education, as both an undergraduate and postgraduate student, it is readily apparent that the over-riding majority of my experiences were deeply embedded within what McGregor (2018) identifies as the scientific, empirical approach. Indeed, I cannot recall actually being aware that alternative approaches even existed (or did I just ignore or dismiss them without thought?). These early reflexive accounts afforded me the opportunity to become more consciously aware of my own philosophical position and, consequently, the initial stages of my research adventure represent my first conscious, yet tentative, steps away from the positivist indoctrination towards a more interpretive approach to viewing the realities of being human in this world.

Moving to an interpretive methodology allows me not only to acknowledge, but to positively benefit from my life experiences outside of academia, which have been extremely valuable in shaping the way in which I see and understand the world. Indeed, Dickinson, Fowler and Griffiths (2020) reported that many 'pracademics' place extremely high value on their real-world experiences to inform their practice, so I will be actively seeking the opinions of other practitioners to help bring a diverse range of thoughts and experiences to my work from beyond the academic world.

Therefore, I have initially used a heuristic approach (Rodgers, Jacelon and Knafl, 2018) to build a conceptual framework for my research, by employing primary data collection and analysis, literature review strategies and reflexivity synergistically (see figure 2: schematic of the research process) to gain an understanding of physical intelligence as a phenomenon. Continuously cycling between these three cogs is akin to the hermeneutic circle commonly used in phenomenology to gradually gain deeper insights and awareness to my work (Suddick, Cross, Vuoskoski, Galvin and Stew, 2020).

This process has evolved over the course of my research to date as I have slowly shed the lab coat and begun to more firmly embody the interpretive methodology as I tried to make sense of the phenomena and equally my relation to it as a researcher. (see infographic conference posters figures 3 and 4) recognising, for example, that concepts are dynamic and not subject to strict borderlines (Rodgers, 1989).

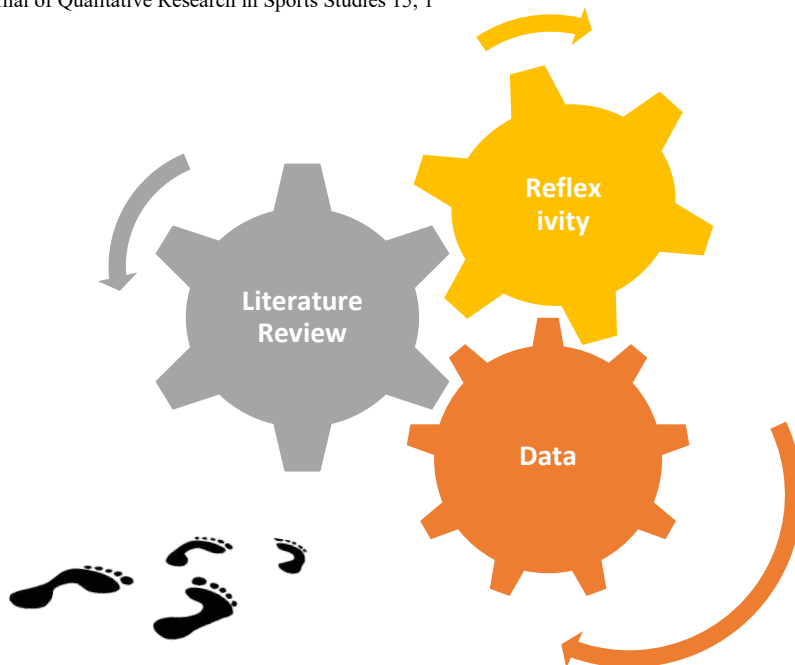


Figure 2: Schematic view of the research process

Seeking guidance and direction from similar studies undertaken in the intelligence field, my initial foray into data collection followed in the footsteps of Sternberg who, along with Yang (Yang and Sternberg, 1997) sought to understand cultural perceptions of intelligence by asking members of the public a single, open-ended question to describe, in their own way, characteristics of an intelligent person. This approach seemed to perfectly meet my needs to gain the opinions of others, providing a proven method for collecting data, avoiding lengthy and potentially time-consuming questionnaires but producing focussed data with which I could sharpen my analytical skills. My single open-ended question was:

In your opinion, what are the characteristics of a physically intelligent person?

Having determined the method and gained ethical approval, the next step was to recruit participants. Aware that perceptions of intelligence could be influenced by many factors, such as culture, experience or education, I emailed a call for participants to a purposive sample (Coyne, 1997) of twelve high-profile individuals from predominantly Western backgrounds (though a few had significant eastern influence), that I believe represented a wide spectrum of stakeholders from PE and wider physical culture.

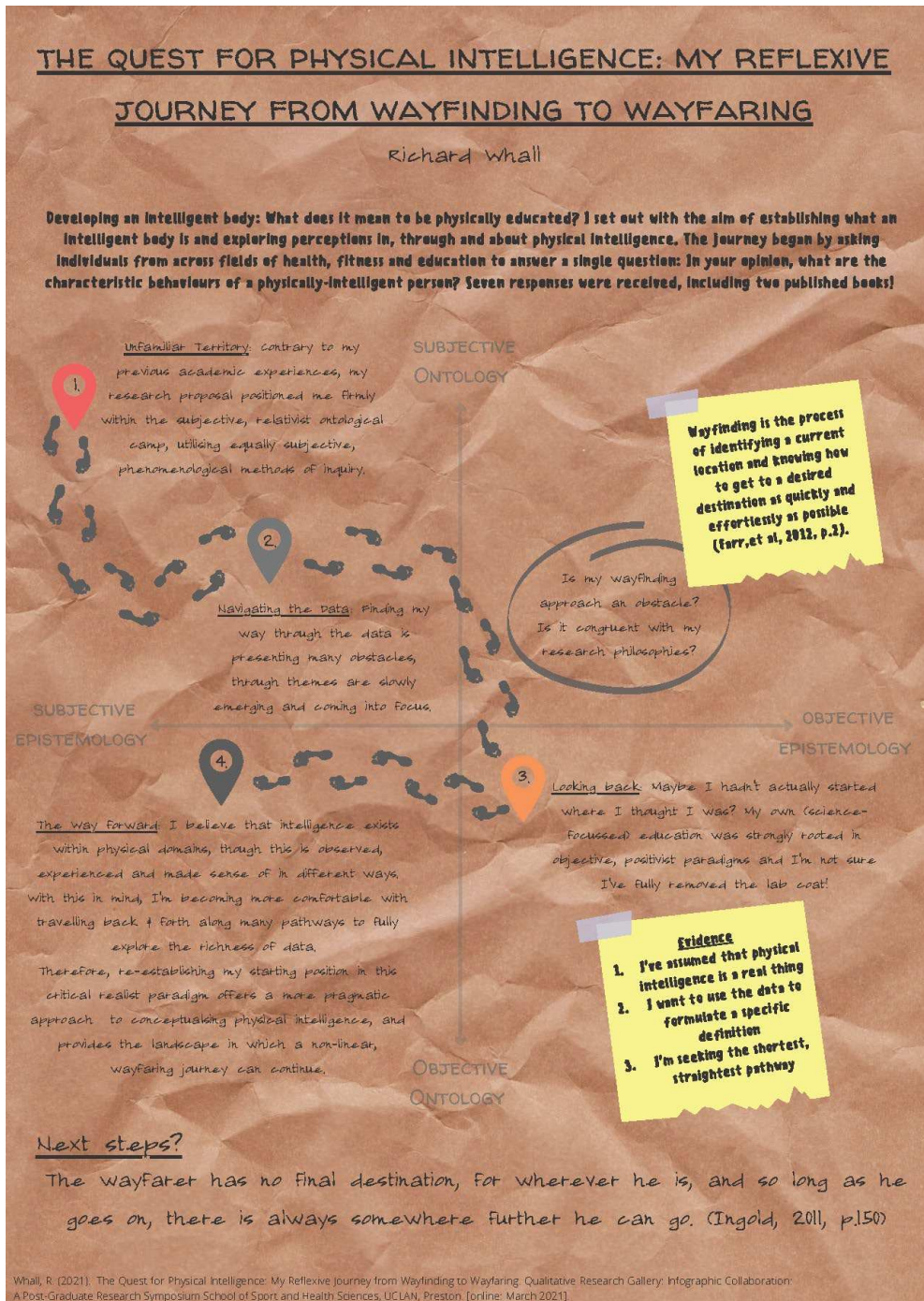


Figure 3: Infographic conference poster [1]
methodological and philosophical positioning of the physical intelligence body-project
(Whall, 2021).



Figure 4: Infographic conference poster [2]
 Body-parts and feelings - sensorial epicentres for the physical intelligence body-project
 (Palmer, Whall, Sellers, Grecic and Hughes 2021)

Data analysis began by adopting a thematic approach (Sparkes and Smith, 2014), which is well suited to the interrogation of qualitative data due to its inherent flexibility and application across range of sample sizes (Clarke and Braun, 2017). As an on-going process of analysis, cycles of both data-driven and concept-driven coding were pursued (Gibbs, 2018), the inter-play between the three cogs allowing potential themes to be constructed and amended as I became more familiar with the data (see Braun, Clarke and Hayfield, 2019). Intertwined within the analysis of the data, emerging themes helped to direct me towards new literature alongside those identified by systematic key word searches and guided by my own reflexive thoughts as my understanding developed.

Perceptions of intelligence: initial findings and discussion

Seven responses to my single question questionnaire were received, ranging from a couple of paragraphs through to twenty minutes of voice recording, frequent handwritten letters with updated thoughts and two published books. The range of respondent backgrounds was equally diverse, including a PE teacher, a world recognised natural movement/fitness leader, a yoga and breathwork coach, a senior gymnastics coach, martial arts expert, educational psychologist and former dancer turned leadership guru.

Viewing this huge pool of data, I was immediately struck by both its depth and breadth and struck with fear reminiscent of my own Primary School experiences of swimming lessons and the fear of drowning. I spent some time tiptoeing around the edges, occasionally wading in up to my ankles but still hesitant to fully dive in. Why did I feel like this? What impact had reading the first line of that first response really had on me? As I familiarised myself with the data (still not sure immersing is an appropriate word choice at this stage) the water slowly became less murky, tabulating notes and using highlighters to begin to code the data. I am immediately struck by meanings given akin to current interpretations of physical literacy and Gardner's (2004) definition of bodily-kinaesthetic intelligence, given as 'the ability to use one's body in highly differentiated and skilled ways, for expressive as well as goal-directed purposes' (p.206). For example, two respondents explained:

A physically intelligent person is someone that understands movement.

Physical intelligence is an ability to effectively and efficiently operate one's body through movement.

In contrast, there were many in-depth and thought-provoking notes from one respondent, his communications serving as stimulus for much thought, offering direction for further inquiry rather than direct answers, when asking, for example:

Is there such a thing as physical intelligence?

We might use physical skills – but does this count as physical intelligence?

[Is] physical intelligence the learning of physical skills? I would have thought not! It is perhaps the utilisation of the skills within a context – in an intelligent manner – that perhaps comes nearest to the description of physical intelligence?

It seems, in this respondents opinion, that intelligence must include some form of knowledge or thinking, which may manifest as actions to solve problems in a physical context, which are not purely confined to sports and the narrow, health conception of physical activity, as Margaret Whitehead (2001) used to develop the concept of Physical Literacy, but evident in the creative and artistic elements of man the doer and man the maker. Furthermore, as I engaged with more responses from all my respondents, which were becoming longer and more detailed, alternative viewpoints began to emerge, for example:

Physical intelligence as I see it is a by-product of the development of the cognitive functions known as introverted sensing and extroverted sensing.

Having physical intelligence does not mean you don't get injured, miss signs of compensation patterns or have perfect form. It does not mean that you are free of disease or chronic conditions. It is the idea that through these challenges you learn to speak the language of the body, which has a direct effect on the mind.

Concerning sensing and body language, it seems apparent from these responses that the meaning of 'physical' goes deeper than movement competence or efficiency, and may actually hint at literacy, if literacy infers the capacity to communicate. Further questioning of Whitehead's (2001) decision to only look at actions of large muscle groups in her conception of Physical Literacy, sensing (also referred to as perception), therefore, seems to be an important aspect of physical intelligence, in terms of being able to connect to your body and your physical environment. This is supported by my own experience of sensory-motor amnesia, as Hanna (2004) identifies it, and relates to Gibson's (1979) ecological theory of perception and action. Adding another angle to this discussion, a respondent, in a book she provided in response to my question (i.e. Dale and Peyton, 2019:1), suggests that:

Physical Intelligence is the active management of our physiology – the ability to detect and strategically influence the balance of chemicals in our bodies and brains.

Expanding beyond movement of the body to incorporate the movement of chemicals within our body, this aspect of physical intelligence plays a major role not only in our physical health, but also highlights a close relationship between our physical, mental and emotional health and well-being. Indeed, takes this further still with her comment that:

Physical and emotional intelligence, I don't think that you can separate the two. They are two sides to the same coin. And the intelligence of the breath is the bridge between the two. Breath, thought and movement is inherent in every second of our existence.

Breath, and the awareness of breathing is a central feature of many Eastern based movement practices, such as Yoga and Qigong, however, by contrast, ‘breathing’ re: exercising, only seems evident in traditionally Western practice during activities designed to leave you ‘out of breath’. Could this concept of being able to actively manage your internal physiology be a significant feature of physical intelligence? It reminds me of the much-vaunted capabilities of the world-renowned *Ice-Man* Wim Hof, who subjected himself and others under his guidance, to scientific scrutiny and demonstrated that some form of physiological self-control is indeed possible (Kox *et al*, 2014).

Another central theme evident in the data is the question of learning and development. To what extent can physical intelligence be learnt, and how much is the result of physical development and maturity? Two respondents referred to physical intelligence as something that develops naturally as a result of experience, with another highlighting the instinctive movement of babies as a prime example, and that the ability to learn quickly may be indicative of greater physical intelligence. These two respondents suggested that this development of physical intelligence is a life-long process, which is key, they believed, to the physical literacy concept. Similar to one respondent’s discussion that instinct is a driver of personal development, another offered two routes to developing physical intelligence; sport/martial arts and/or free-play, preferring play as a learning tool (Kolb and Kolb, 2010) and a possible new pathway to explore in the research:

For some, their childhood taught them what they needed to know. It was intrinsic. Through a rich environment of nature, play, exploration and safety, they developed their senses and learned to interact with the environment around them.

With much to ponder and explore from this combination of ideas and responses, it seems an appropriate time to re-visit the literature in an attempt to take a fresh look at what intelligence means. In seeking a unified definition of intelligence to support their work in Artificial Intelligence, Legg and Hutter (2007) proposed an informal definition of intelligence based on their analysis of a collection of more than seventy unique definitions. Re-tracing their steps, I utilised the same compilation of definitions, developing my own coding skills as I identified a number of recurring themes that I further narrowed down to provide the basis for definition of physical intelligence. This is summarised in figure 5.



Legg and Hutter (2007) proposed that intelligence:	Researcher inferences: Physical Intelligence demonstrates:
<ul style="list-style-type: none"> ➤ Measures an agent's ability to achieve goals in a wide range of environments ➤ Is a property that an individual agent has as it interacts with its environment or environments. ➤ Is related to the agent's ability to succeed or profit with respect to some goal or objective. ➤ Depends on how able the agent is to adapt to different objectives and environments. 	<ul style="list-style-type: none"> - An individual's ability to operate (perceive and act through physical means) purposefully and successfully within their environment. - The ability to understand and learn from their interactions and experiences within their environment. - The ability to use/apply/adapt purposefully and successfully in a variety of environments and future situations.

Figure 5: A working definition of physical intelligence from researcher inferences

The initial themes emerging from my first engagement with the data were combined with elements identified in my analysis of published definitions of intelligence and used to support a second, somewhat more immersive engagement with the data, starting with the book (Claxton, 2015) that was offered in response to my question, and a powerful suggestion that is made within the opening chapter:

'I'm not proposing another kind of intelligence to add to the list. My contention here is more radical than that. It is that practical, embodied intelligence is the deepest, oldest, most fundamental and most important intelligence of the lot; and the others are aspects or outgrowths of this basic, bodily capability. Emotional intelligence is an aspect of bodily intelligence. Mathematical intelligence is a development of bodily intelligence. There is a world of difference between human intelligence, properly understood, and mere cleverness (p. 9).

I've been looking at physical intelligence as another kind of intelligence, but actually, does Guy Claxton's notion of Physical Intelligence capture the essence of what I've already extracted from the data? There are hints at intelligence within the body, such as 'deepest, oldest and most fundamental' which has an evolutionary vibe to it. Claxton also utilises a number of related terms 'practical, bodily and embodied' – are these all physical? I have already highlighted limitations in conceptualisation of Physical Activity, and whilst Arnold (1991) suggests 'movement' education to be a more appropriate term than Physical Education, the term 'movement' is equally beset by issues of perception (Bowman, 2018) and intention (Best, 1974). Together, these bring a whole other meaning to fundamental movement skills, incorporating every movement not just of the body, but also the perception of movements within and around the body; the sense of breath for example, or chemicals or forces which

provide us with our proprioceptive sense of self. And are these all, as Stoffregen, Mantel and Bardy (2017) assert, connected within one single perceptual system? This broader connation of movement, even more fundamental than laying foundations for developing sporting ability, are the skills which allow us to interact with and know ourselves, as a body in the world, and thus laying the foundations for cognitive, social and emotional skill development. One respondent in this study, as an eminent educational figure, clearly values this form of intelligence highly.

Similarly, Sheets-Johnstone (2019) believes that kinaesthetic sensing is the basis of all human learning, and this notion is also evident in Piaget's work which sees sensory-motor development as the platform for higher level cognition – albeit too often confined to a narrow age band of 0-2 years old. So, if Claxton's (2015) theory of physical intelligence, as the foundation of all intelligences is validated, and if high levels of mental cognition matter so much in the adult world (Gottfredson, 1997), then the true value of physical intelligence far exceeds the current, narrow health and sport focussed obsessions in Physical Education in schools.

Dualistic language of Body and Mind features prominently throughout the intelligence research and my collected data (and, on reflection, my own writing), posing a challenging obstacle to overcome, i.e. could the 'relationships' theme provide a potential solution? Bennett and Hacker (2003) coined the term 'mereological fallacy' in an attempt to debunk the artificial, reductionist separation of body-mind in (neuro)science, claiming it fails to recognise the real-life complexity of human being, and which could therefore stifle the full realisation of physical intelligence. So, rather than just looking for intelligence within the body, does the intelligence actually reside within the relationships between body-mind and body-world, or even body-mind-environment? Moe (2005) considers intelligence as distributed throughout the entire being, while Warren (2006) asserts an ecological explanation for skilful movement resulting through the dynamical interaction between a physical body in a given environment, whilst Masis (2014) conceives of intelligence as embedded/embodied coping, calling for body, brain and world to be put back together again.

The cycles of my research to date are now marked by reflexive entries in my research diary between; reading, data collection, data management, initial analysis... thinking and talking... punctuated at every point with more reading. As the hermeneutic circle continues to revolve (Sparkes and Smith, 2014) a plan of action to progress has emerged, for example:

- ❖ Re-visiting the extensive written responses from one respondent and his discussions of 'knowing-how' and 'knowing-that', led me to Hopsicker's (2009) examination of kinds of knowing and Arnold's

(1991) discussions on learning, and hence knowing, in, through and about movement, both of which demand further attention.

- ❖ Looking more closely at communication and relationships between body-mind and body-environment may help to re-connect them following their artificial separation. This highlights the need to delve deeper into body and perceptual based philosophical writings such as those of Merleau-Ponty, Heidegger, Hacker and Sheets-Johnstone, as Warburton (2011) has begun in the realms of dance, for example.
- ❖ Reviewing comments made in relation to ‘learning and development’ has highlighted the recurrence of adaptability as a form of learning, with a strong evolutionary basis (Richardson, 2010), and linking to Sternberg’s (2020) updated view of intelligence as the ability to adapt.
- ❖ Relationships between these themes are also evident and worthy of further exploration, the use of metaphorical language, for example, help us to learn, know and make sense of the world around us (Lakoff and Johnson, 2003).

Therefore, moving forwards with the view of physical intelligence as an embedded, embodied re-connection of body-brain-world, I further refined the emergent themes in to a nested format, figure 6, working inwards from the broad conceptualisation of physical intelligence and understanding its purpose and perceived value, through three key themes of ‘ways of knowing’, ‘relationships and communication’ and ‘learning and adaptability’:

Ways of knowing:

- ❖ For example, knowing what to do in a given physical context/environment; knowing how to do it; knowing that it is being performed efficiently and effectively; knowing about the human body; knowing yourself as a body; knowing within the body.

Relationships and communication:

- ❖ For example, conscious awareness of your body and being a body; communication within and between complex systems of the body; interactions between body and environment.

Learning and adaptability:

- ❖ For example, how do you learn and develop different ways of knowing; how do you learn to perceive, respond and adapt to your body, as a body and to the environment.

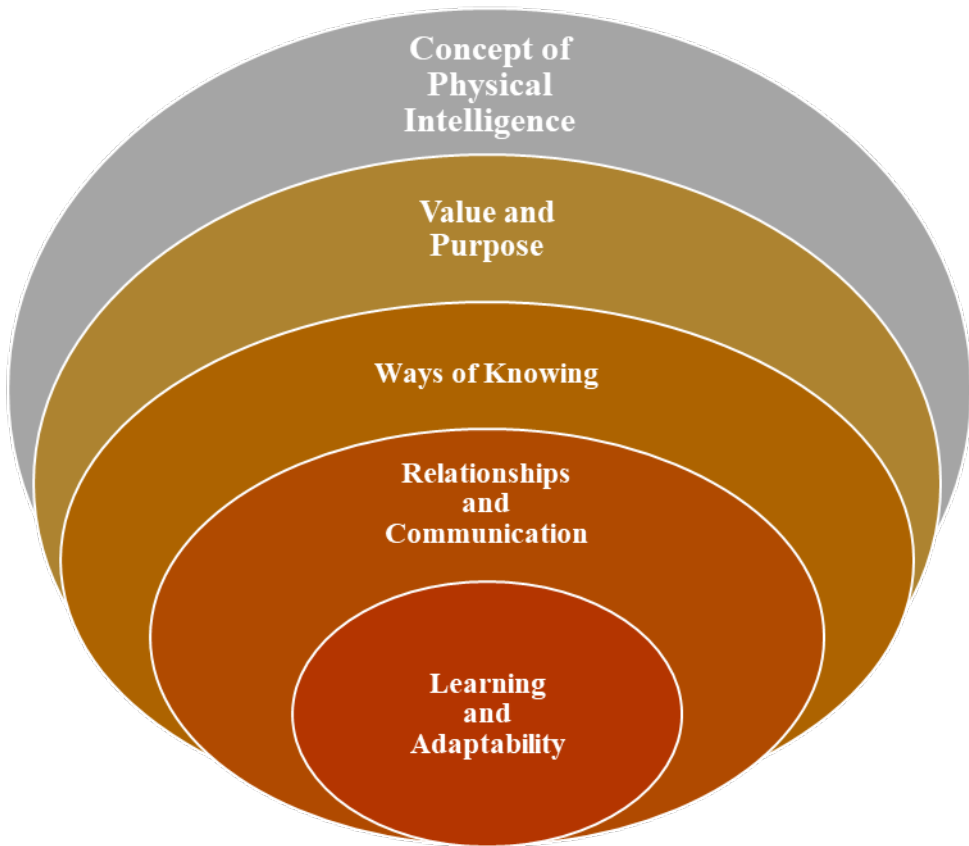


Figure 6: A working definition of physical intelligence from researcher inferences

Moving towards deeper meaning: next steps on the research adventure

I agree with Quay (2016) that fully grasping phenomenological methodology can be very challenging, though I am slowly beginning to feel more like a qualitative researcher and gaining a better understanding of phenomenological meaning and my own positionality in this project. I intend to continue following the hermeneutic process to further develop the conceptualisation of physical intelligence, not only through a deeper dive back into the data and associated literature, but also through the capture and analysis of richer data collected through lived experiences of physical intelligence. This will continue to be set against a growing reflexive story of my development towards becoming a researcher around this problem of Physical Intelligence. The aim of the next stage of inquiry is to realise the potential of phenomenology (Allen-Collinson, 2009; Kerry and Armour, 2000) to reveal further insights into what it means to be physically-intelligent, i.e. how do individuals know they are physically intelligent and what experiences have allowed them to learn and develop i.e. the process of being and becoming physically educated.

Bipedalism, with its deep, evolutionary origins (Jung *et al.*, 2018) and prominence within the story of human evolution (Mattson, 2012), will be used, in the form of running (road, trail and free) as a research vehicle, following in the footsteps of Hockey's (2006) previous explorations of the sensory aspects of distance running. In order to manage the complex phenomena of physical intelligence, the current themes of: ways of knowing, relationships and communication, and learning and adaptability, will be used as focal points for structuring interviews, and potentially focus-groups, to explore, for example, how different runners and coaches:

- know of, and experience, physical intelligence, in themselves and others
- relate to, and communicate with, their body and physical environment, during the act of running
- have learned (and coached) how to run, efficiently and effectively, in different environments.

Working through the phenomenological process outlined by van Manen (1990), this next step will begin by writing about my own running experiences and the (re)development of my own physical intelligence (reflexively). Breivik (2011) highlights the importance of being actively involved in the activity in question, so focussing initially on my personal experiences will allow me to gain 'a more precise sense of what we are attempting to obtain' (van Manen, 1990:64). This will also afford opportunities to:

- 1) Explore body-anchored approaches to interviewing, based on previous work of Stelter (2010) and Hughes and Palmer (2020) that may help to overcome the inherent challenges of capturing the essence of sensory-laden experiences, and
- 2) Enhance my research and writing skills through the process of crafting, editing and re-writing the emergent narrative (Crowther, Ironside, Spence and Smythe, 2017).

To help identify and interpret meaning and make sense of bodily experiences, Stelter (2010) suggested the use of images as a visual stimulus, whilst Hughes and Palmer (2020:346) reflected that physical 'props or prompts would have been beneficial to generate an instant collective sensory understanding'. Therefore, I intend to experiment with the use of video, not only as an interview aid, but also in the creation of film as a form of visual phenomenological 'text' to compliment traditional written formats. This, Goble (2019) persuasively argues, allows for deeper phenomenological analysis and has the potential to reach a wider audience and create greater impact, and is, as a presentation strategy, becoming more accepted within academia (Gupta, 2019; Loht, 2017).

Conclusion

Against a backdrop of mind-brain hegemony and increased emphasis on Physical Education to become (or continue) merely as physical activity for health (i.e. an exercise opportunity), historical calls for a fresh focus on the physicality of learning have been largely unheard or ignored. However, as demonstrated in this article, there is great hidden potential in both ‘physicality’ and ‘intelligence’ to respond positively to these calls, building on developments in disciplines such as Cognitive Science, Evolutionary Psychology, Human Movement Studies and Ecological Dynamics to critically explore the notion of being physically educated and how physical sensations may impact upon learning. The potential for practitioners working within Outdoor Education - in its broadest sense, and beyond Physical Education - in its restricted curricular sense, to benefit from this research is considerable. New boundaries may be established to understand and appreciate what being physically educated may look like, in process and as product, to the benefit of our bodily health and bodily intelligence... given they may be ‘as one’.

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Reviewer Comments

The paper presents a valuable insight into the philosophical evolution that engaging in Doctoral study can facilitate. The reflections offer an insider's view of the continual ruminations and the evolution in thinking that all supervisors strive for in their students. Of the topic itself, I am pulled towards thinking about the implications and impact of becoming 'physically educated' and what that means to the PE profession. Traditional views embedded via teacher training must bear some responsibility for the dualist position encountered by the authors. The research findings point to a situation where our current modes and conceptualisations of learning are no longer fit for purpose. It feels as though this study is the basis of a 'call to action' and a need for change, both in UK schools, and the institutions responsible for educating its teachers. I have no doubt that this philosophical shift is greatly needed but wonder whether the gatekeepers in UK education are ready.