



## Abstract

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**Introduction:** Despite increases in research and implementation, physical literacy continues to be largely misinterpreted by practitioners. The purpose of this study was to devise, implement, and evaluate a professional development programme that works in a primary school environment to enhance their knowledge and operationalisation of physical literacy.

**Methods:** Following a three-month needs assessment phase, data were collected from structured observations, reflections, and semi-structured interviews with the teachers, before, during and after an introductory workshop and six-month physical literacy intervention. Thematic analysis was used to evaluate perceptions of programme effectiveness.

**Results:** The needs assessment phase identified notable differences between teachers' classroom and physical education practice. Results of the physical literacy workshop and intervention detailed an increase in teachers' knowledge of, and operationalisation of, physical literacy.

**Discussion/Conclusions:** Applying established principles of effective professional development in a contextually sensitive manner was viewed as effective in enhancing primary school teachers' knowledge and practice regarding physical literacy.

**Keywords:** Physical Literacy, Physical Education, primary education, PE-CPD.

47           Despite the increased interest and attention around the concept of physical literacy on  
48 a global and political level (Dudley, Cairney, Wainwright, Kriellaars, & Mitchell, 2017), it  
49 continues to be largely misinterpreted by practitioners, including school teachers (Edwards,  
50 Bryant, & Jones, 2015). A systematic review conducted by Edwards, Bryant, Keegan,  
51 Morgan, and Jones (2017) revealed that the majority of papers (70%) adopted a  
52 ‘Whiteheadian’ definition of physical literacy. Whitehead’s definition was founded on the  
53 philosophical groundings of phenomenology, existentialism, and monism and is defined as  
54 “the motivation, confidence, physical competence, knowledge and understanding to value  
55 and take responsibility for engagement in physical activities for life” (International Physical  
56 Literacy Association [IPLA], 2016, para. 1). Recent developments have placed an emphasis  
57 on the social capability alongside the physical, affective, and cognitive domains of physical  
58 literacy (see Keegan et al., 2019). An in-depth critical discussion of the philosophical  
59 foundations of physical literacy is beyond the scope of the present paper (see Pot, Whitehead,  
60 & Durden-Myers, 2018). Nevertheless, practitioners should be aware of the key foundations  
61 that underpin the philosophy of physical literacy in order further understand how to  
62 operationalise the concept in practice (Shearer et al., 2018). Even so, there have been many  
63 debates around how best to operationalise the complex, multifaceted, and non-linear concept  
64 of physical literacy (Edwards et al., 2018; Durden-Myers, Green, & Whitehead, 2018).

65           Although physical literacy is relevant throughout the life course, currently, school-  
66 based physical education (PE) lessons have been recognised as the most common  
67 environment in which children and adolescents can develop their physical literacy (Edwards  
68 et al., 2018). In this context, many advocates consider physical literacy as the main outcome  
69 of high quality PE provision to generate healthy, able, and active citizens (McLennan &  
70 Thompson, 2015). For most children, PE is their first encounter of structured physical  
71 activity, therefore positive, high-quality experiences of physical activity should be nurtured in

72 primary schools (Kirk, 2012). Such positive experiences are engendered by teachers  
73 delivering high-quality PE lessons (Penney, Brooker, Hay, & Gillespie, 2009). High-quality  
74 PE can be achieved when the curriculum, pedagogy, and assessment are successfully  
75 integrated and aligned (Bernstein, 1977). Indeed, solely considering the content of the  
76 curriculum is not sufficient to provide a quality educational experience for pupils (Penney et  
77 al., 2009). Research indicates that primary teachers' insecurities are partially related to  
78 limited content knowledge, but primarily they are due to pedagogical concerns (Harris, Cale,  
79 & Muson, 2012). These insecurities are unsurprising given that 40% of generalist primary  
80 school teachers in the UK receive less than six hours of PE training during their initial  
81 teacher education and training (Blair & Capel, 2008).

82           Limited PE content knowledge and lack of training opportunities impair teachers'  
83 abilities to plan lessons effectively with many primary teachers omitting PE lesson planning  
84 altogether (Sloan, 2010). Consequently, primary school teachers who lack confidence in  
85 teaching PE are less likely to deliver high quality PE, and in turn, less likely to impact  
86 positively on pupils' physical literacy (Taplin, 2013). The primary school age-group (aged 4  
87 – 11 years) is viewed as a critical period in the development of physical literacy and healthy  
88 behaviours (Larouche, Laurencelle, Shephard, & Trudeau, 2015), rendering primary school  
89 teachers' limited knowledge and operationalisation of physical literacy problematic (Cale &  
90 Harris, 2018; Robinson, Randall, & Barrett, 2018). The above-identified shortfalls in  
91 knowledge and implementation can be mitigated via effective professional development  
92 programmes (Hunzicker, 2011).

### 93 **Professional Development Programmes**

94           In teaching and education, professional development programmes provide feasible  
95 opportunities for teachers to develop and refine high quality teaching practice in an ever-

96 changing and multifaceted profession (Phillips, 2008). Specifically, professional development  
97 programmes in PE (PE-CPD) can play a considerable role in upskilling content knowledge  
98 and reducing primary school teachers' insecurities toward teaching PE (Harris et al., 2012).  
99 Nevertheless, like most PE-CPD programmes, they have a tendency to be brief, one-day  
100 workshops that occur off the school site (Jess, McEvilly, & Carse, 2016). Although  
101 workshop-based training can be useful in relaying large amounts of information in short  
102 periods of time, it is known that content covered during brief, "one-shot" workshop-based  
103 professional development programmes are considered to be superficial and less effective  
104 (Hunzicker, 2011).

105 Teachers often question the value of the one-off courses and are usually "passive  
106 consumers" as opposed to actively engaging with their development (Armour & Yelling,  
107 2004). In this context, many workshop-based PE-CPD programmes do not embed the content  
108 alongside teachers' current responsibilities, nor are they supportive and consider teachers'  
109 individual needs. To overcome these shortcomings, O'Sullivan (2002) proposed that initial  
110 stages of CPD programmes should commence with a needs assessment phase. A 'need'  
111 describes "a desire to improve current performance or to correct a deficiency" (Barbazette,  
112 2005, p. 5). In turn, the needs assessment phase is crucial as it avoids generic learning  
113 opportunities, focuses on teachers' growth and nurtures them as learners (Armour,  
114 Quennerstedt, Chambers, & Makopolou, 2017). An emphasis on teachers' 'growth' can be  
115 supported by creating a collaborative environment and allow opportunities for teachers to  
116 work with peers, provide and receive feedback and share good practice (Hunzicker, 2011).

117 Often, PE-CPD programmes, particularly with primary schools, focus on upskilling  
118 teachers' PE content knowledge and offer resource materials as a mechanism to support their  
119 learning (Armour & Yelling, 2004). However, resource-driven professional development  
120 programmes do not adequately provide teachers with an in-depth knowledge-base and they

121 are unlikely to be impactful at a national level (Atencio, Jess, & Dewar, 2012). Instead, PE-  
122 CPD programmes should upskill teachers' content knowledge and pedagogical practice in PE  
123 to ensure the professional development programme is instructional-focused (Hunzicker,  
124 2011). In the context of PE-CPD with a focus on physical literacy, consideration for the the  
125 complex and non-linear nature of the development of the concept is required (Edwards et al.,  
126 2018). Many PE-CPD programmes do not account for the complexity of the learning process,  
127 understand the context and contemporary theory, or support the bridge between theory and  
128 practice (Armour et al., 2017). This concern is heightened in primary schools whereby  
129 generalist teachers do not commonly specialise in PE in the UK, hence requiring effective  
130 and long-lasting professional development opportunities.

131 In respect of the literature, nine key principles of effective professional development  
132 in PE and physical literacy emerged, specifically:

- 133 1. Begin with an in-depth needs assessment consultancy process to evaluate the  
134 individual needs of the school and the teachers (Hunzicker, 2011; O'Sullivan, 2002).
- 135 2. Consider the complex and non-linear nature of the development of physical literacy  
136 (Edwards et al., 2018).
- 137 3. Create a supportive environment and tailor the professional development program to  
138 the needs of the teacher, school and local authority goals (Hunzicker, 2011;  
139 O'Sullivan, 2002).
- 140 4. Embed the content of the professional development program alongside teachers'  
141 current job duties and responsibilities and encourage teachers to reflect continually on  
142 the learning process (Hunzicker, 2011).
- 143 5. Upskill teachers on content knowledge and pedagogical practice in PE to ensure the  
144 professional development program is instructional-focused (Hunzicker, 2011).

- 145 6. Focus on teachers' 'growth' and nurture them as learners and bridge the theory-  
146 practice gap (Armour et al., 2017).
- 147 7. Create a collaborative environment (Hunzicker, 2011).
- 148 8. Place an emphasis on sustainability and avoid one-off training opportunities such as  
149 workshops (Atencio et al., 2012; Hunzicker, 2011).
- 150 9. Do not rely solely on resource material as resource-driven professional development  
151 programmes do not adequately provide teachers with an in-depth knowledge-base and  
152 they are unlikely to be impactful at a national level (Atencio et al., 2012).

### 153 **Purpose**

154 The purpose of the present study was to devise, implement, and evaluate a  
155 professional development programme that works in a school-based environment with Welsh-  
156 medium primary school teachers. The present study explored how the aforementioned  
157 professional development programme modified teachers' knowledge and operationalisation  
158 of physical literacy. This study was part of a wider research project funded by the *Coleg*  
159 *Cymraeg Cenedlaethol* (Welsh National College).

### 160 **Methods**

#### 161 **Sampling and School Selection**

162 Following institutional level research ethics committee approval, a purposive  
163 sampling procedure was employed to select the schools for this study (Patton, 2002).  
164 Specifically, Welsh-medium schools were selected because it was a key requirement of the  
165 funding body, the *Coleg Cymraeg Cenedlaethol*. Written informed consent from two head  
166 teachers and three primary school teachers was collected to allow participation in the study.  
167 Further, year six (fifth grade) pupils in their final year of primary school (aged 10-11) who  
168 received two one-hour PE lessons per week, were the key focus of this study, given that

169 physical literacy should be nurtured in primary before transitioning to secondary school  
170 (Zeedyk et al., 2003).

171 Two primary schools from different socioeconomic demographics across South  
172 Wales, UK, were recruited through email contact with the respective head teachers. These  
173 two different schools provided an authentic context for the complexity and uniqueness of  
174 these individual demographics, hence were selected for this purpose. The schools in this  
175 study are subsequently referred to as the ‘urban school’ and the ‘rural school.’ The urban  
176 school was based in a metropolitan area, whereas the rural school was based in the south  
177 Wales valleys, a group of post-industrialised valleys in South Wales. Notable differences  
178 between the two schools included the percentage of pupils eligible for free school meals, the  
179 number of year six pupils enrolled in each school, the number of year six classes per school,  
180 and, the number of year six teachers per school. Table 1 summarises the characteristics of  
181 both schools.

182 [[ insert Table 1 about here ]]

### 183 **Professional Development Programme**

184 A professional development programme to enhance Welsh-medium primary school  
185 teachers’ knowledge and operationalisation of physical literacy (PDPL) was designed and  
186 implemented in the academic year 2014-15. Throughout the PDPL, the principle investigator  
187 (PI) was based in each primary school for two days per week. The research design consisted  
188 of three phases: (a) needs assessment (September-December 2014); (b) physical literacy  
189 workshop (January 2015); and (c) physical literacy intervention (January-July 2015).

190 **Phase 1.** A three-month qualitative needs assessment phase with no intervention was  
191 conducted in order to observe teachers’ knowledge and operationalisation of physical literacy  
192 as well as assess their confidence and competence in teaching PE. This phase identified the



193 teachers' everyday behaviours through structured observation of their teaching practice in  
194 both classroom and PE lessons (see Table 2). Needs were identified for each teacher based on  
195 the observations (two days per week) and were addressed in Phase 3. Before commencing  
196 with Phase 2 of the study, the teachers were interviewed individually for approximately 40  
197 minutes using a semi-structured interview guide to characterise their knowledge and  
198 understanding of physical literacy.

199 [[ insert Table 2 about here ]]

200 **Phase 2.** A one-hour workshop took place in January 2015 which aimed to upskill  
201 teachers' knowledge on the definition of physical literacy through interactive tasks. Firstly,  
202 the workshop highlighted the importance of physical literacy in the form of a lecture (e.g.,  
203 developing the whole child). Secondly, various examples of physical literacy in international  
204 policy were shared with teachers, placing emphasis on its increased popularity. Thirdly,  
205 teachers were asked to write their definition of physical literacy which naturally stimulated  
206 discussion around some common misconceptions (Edwards et al., 2015). Fourthly, the  
207 definition adopted by the IPLA was shared with teachers, which included explanations of the  
208 physical, affective, and cognitive characteristics and the physical literacy journey (Edwards et  
209 al., 2017). Finally, teachers were asked to draw their own physical literacy journey.

210 **Phase 3.** After the workshop, a six-month physical literacy intervention was  
211 conducted with the year six teachers (January – July 2015). The nine principles of effective  
212 professional development were implemented in the physical literacy intervention. For  
213 example, the physical literacy intervention embedded teachers' individual needs identified in  
214 Phase 1 and was considered collaborative and supportive as the PI conducted flexible weekly  
215 collaborative discussions (approximately 20 minutes) with the teachers to plan and reflect on  
216 their PE lessons. Weekly collaborative discussions were dialogic and the content and

217 pedagogy of the previous PE lessons were embedded into discussions. This embedded  
218 process was accomplished by concentrating on one curriculum focus (e.g., activity-specific  
219 practice and content knowledge) and one pedagogical focus (e.g., differentiating the tasks)  
220 every week. Throughout Phase 3, the teachers were central in the decision-making process  
221 and ultimately the PI's role was to support them during the planning for PE lessons and  
222 empower them to make decisions about PE lessons. The intervention was instructional-  
223 focused as the weekly collaborative discussions with teachers centred on the curriculum  
224 (what was taught), pedagogy (how it was taught), and assessment (impact on pupils'  
225 learning), in order to develop pupils' physical, affective, and cognitive domains of physical  
226 literacy (Bernstein, 1977; Penney et al., 2009; Whitehead, 2010). Further to discussing PE  
227 lessons, the collaborative discussions occasionally focused on how teachers could develop  
228 physical literacy within other areas of the curriculum. This included collaboratively  
229 discussing opportunities to develop pupils' knowledge and understanding of healthy and  
230 active lifestyles in other subject areas (Edwards et al., 2017). At the end of Phase 3, the semi-  
231 structured, 40-minute individual interviews focusing on teachers' knowledge and  
232 understanding of physical literacy were repeated such that the pre- and post-intervention  
233 interviews could be compared.

### 234 **Data Sources and Analysis**

235 A range of qualitative research sources were utilised throughout Phase 1 and Phase 3,  
236 to include: notes taken during the lesson observations of PE lessons (Brito, 2009) and  
237 reflections (Gibbs, 1988); weekly reflective collaborative discussions with the teachers to  
238 plan high quality PE lessons; and, semi-structured interviews with the teachers about their  
239 experiences before and after the intervention (see Appendix 1). The interviews audiotaped  
240 and subsequently transcribed for purposes of analysis. Before qualitative analysis procedures  
241 began, back translation was conducted from Welsh into English for accuracy and

242 interpretation (Duda & Hayashi, 1998). For the back-translation process, the PI translated the  
243 transcripts from Welsh to English, and then the second investigator translated the English  
244 version back to Welsh. Both translators then compared the original Welsh version and the re-  
245 translated version, and the process continued until semantic similarity was achieved (Duda &  
246 Hayashi, 1998).

247 Deductive and inductive thematic analyses were performed using six phases of  
248 analysis, specifically: (a) familiarization with the data, (b) generating initial codes, (c)  
249 searching for themes, (d) reviewing themes, (e) defining and naming themes, and (f)  
250 producing the report (Braun & Clarke, 2006). The PI generated initial codes deductively and  
251 the theoretical/deductive thematic analysis was driven by the knowledge and  
252 operationalisation of physical literacy. Trustworthiness was addressed in accordance with  
253 Lincoln and Guba's (1985) criteria: credibility, transferability, dependability, and  
254 confirmability.

## 255 **Results**

256 Two major themes were identified based on the deductive analysis of the lesson  
257 observations, reflective discussion collaborations, and interviews: *Knowledge of Physical*  
258 *Literacy*, and *Operationalising Physical Literacy*. Sub-themes with these two major thematic  
259 categories will be presented in this section.

### 260 **Knowledge of Physical Literacy**

261 Three sub-themes evolved from the theme, *Knowledge of Physical Literacy*. The first  
262 sub-theme, *understanding the physical literacy definition*, derived from nine of the lesson  
263 observation notes, 16 of the collaborative reflection sessions, and three of the teacher  
264 interviews. Six examples have been selected to describe this sub-theme. The second sub-  
265 theme, *PE-specific knowledge*, derived from seven of the lesson observation notes, 13 of the

266 collaborative reflection sessions, and three of the teacher interviews. Five examples have  
267 been selected to describe this sub-theme. Finally, the third sub-theme, *recognizing the*  
268 *importance of PE*, stemmed from four of the lesson observation notes, 10 of the collaborative  
269 reflection sessions, and three of the teacher interviews. Six examples have been selected to  
270 describe this sub-theme.

271         **Understanding the physical literacy definition.** The first sub-theme was related to  
272 the growth in the three teachers' understanding of the concept of physical literacy. As the  
273 literacy coordinator in Key Stage 2 (aged 7-11 years), Mrs. Jones' initial definition of  
274 physical literacy "was related to literacy in a PE or physical activity context" (reflection from  
275 the workshop). Similarly, Mr. Rogers alluded to developing literacy skills in his preliminary  
276 definition of physical literacy: "they [pupils] are able to use correct language to describe what  
277 they do and what effect it has on the body" (pre-intervention interview). In contrast to  
278 physical literacy, literacy in PE refers to developing the skills of speaking, listening, reading,  
279 and writing in PE lessons (Department for Education and Skills, 2002). Further, Mrs.  
280 Davies's initial understanding of physical literacy indicated some common misconceptions of  
281 the concept (Edwards et al., 2015; Edwards et al., 2017):

282             I'm going to be quite honest, when I first heard the term, I thought, 'oh dear, what's  
283             this term now?' There are so many terms thrown at us all the time! There's certain  
284             physical skills and also that they [pupils] are more aware that literacy and numeracy  
285             are important and keeping fit is also important for a healthy lifestyle in the future.  
286             (pre-intervention interview)

287 Despite some misconceptions, Mrs. Davies made the connection between healthy lifestyles  
288 and physical literacy, demonstrating an understanding of the wider benefits of the concept  
289 (Murdoch & Whitehead, 2010). Mrs. Davies's quotation suggested that another 'new term'  
290 emphasised the reality of initiative overload in education, and further exemplified a potential

291 barrier in operationalising physical literacy in primary schools (Jerome & Bhargava, 2015).  
292 By the end of the project, however, all three teachers made reference to the holistic and  
293 individualised nature of physical literacy:

294       It's important that we develop the whole child: the physical, the mental, the emotional  
295       and the social parts in PE, so they would carry on enjoying sport and physical activity  
296       after they leave us, and hopefully inspire them to be active for the rest of their life.

297       (Mr. Rogers, post-intervention interview)

298       It's not just about educating them; not just their literacy, not just their numeracy; it's  
299       their awareness of keeping fit in order to make sure that they leave us and go on to  
300       secondary school as a whole child. (Mrs. Davies, post-intervention interview)

301 Mrs. Davies's response alluded to the monist philosophy, whereby pupils' minds and bodies  
302 are inter-related, hence exemplified a deeper understanding of the concept in comparison to  
303 the needs assessment phase (Edwards et al., 2017; Whitehead, 2010; Whitehead & Almond,  
304 2013). This growth in the three teachers' understanding of physical literacy was initially  
305 developed in the workshop and built upon throughout the physical literacy intervention. The  
306 collaborative weekly discussions with the PI centred on the complex and non-linear nature of  
307 physical literacy in line with the key principles of effective professional development.

308       **Growth in PE-specific knowledge.** The sub-second theme was an increase in the  
309 teachers' awareness of, and application of, PE-specific knowledge. In line with the key  
310 principles of effective professional development, the PI shared PE resource material (content)  
311 and importantly, collaboratively discussed the suitability of the resources (pedagogy) for the  
312 pupils (Atencio et al., 2012). However, despite the number of PE resources (manuals, books,  
313 and DVDs etc.) located in the staffroom, the three teachers did not refer to these resources at  
314 all during the needs assessment phase. Consequently, drills aimed at developing physical

315 competence tended to be static in PE lessons throughout Phase 1. For example in hockey, the  
316 “teacher could identify the areas of weaknesses in performance but was unable to  
317 convert/transfer passing into an applied setting. Drills were static and done in isolation. More  
318 active drills are required in order for pupils to successfully transfer into a game situation” (PI  
319 reflection). This observation highlighted Mrs. Davies’ limited application of knowledge in a  
320 games context, specifically, the knowledge and application of modified games and game-  
321 centred approaches (e.g., Teaching Games for Understanding; Bunker & Thorpe, 1982). In  
322 turn, the applied nature of this approach would allow learners to progress from simple to  
323 complex movement capacities (Whitehead, 2010).

324         With reference to the physical competence element of physical literacy (Whitehead,  
325 2010), it was observed that all teachers predominantly developed locomotor skills, partly  
326 developed manipulative skills, however, lacked developing body management skills during  
327 the needs assessment phase. As such, pupils were provided with very few opportunities to  
328 develop the body management skills deemed to be the foundation of other movement patterns  
329 (Whitehead, 2010). In the needs assessment phase, teachers did not plan PE lessons, which  
330 may explain why body management skills were omitted. Indeed, there were disparities  
331 between planning and organisation for classroom and PE lessons. That is, all classroom  
332 lessons were carefully planned and included learning objectives, starter tasks, main activities,  
333 and plenaries in a progressive and differentiated manner; this was not the case with the  
334 planning of the PE lessons. Indeed, Mrs. Davies and Mrs. Jones did not plan any PE lessons  
335 during the three-month needs assessment phase, and though Mr. Rogers planned some PE  
336 lessons during the needs assessment phase, his planning for PE was not carried out in the  
337 same rigorous manner as were his classroom lessons.

338         These needs were identified and implemented into the six-month physical literacy  
339 intervention. During the intervention, all movement vocabularies were planned into PE

340 lessons, including locomotor, body management, and manipulative skills (National  
341 Curriculum for Physical Education [NCPE], 2008). This was achieved from the embedded  
342 collaborative weekly discussions between the teachers and the PI when discussing  
343 competitive (rugby) and creative (gymnastics) activities with Mrs. Davies:

344 ... a variety of travelling movements to develop the locomotor capability such as side-  
345 step, cross over, fast feet, jumping over obstacles and body management skills to drop  
346 to the ground and get back up. (reflection)

347 ... body management skills like dish, arch, front support, back support, balance on  
348 one hand and one foot, different jumps and locomotor skills, such as bunny hops,  
349 foxes, frog hopping and camel walking. (reflection)

350 The weekly collaborative discussions between the PI and Mrs. Davies in the urban school  
351 were crucial in developing content knowledge through applied movement vocabularies in  
352 different environments. Further, in the rural school, planning PE lessons collaboratively as a  
353 trio (PI, Mr. Rogers, and Mrs. Jones) led to an increase in the teachers' PE-specific  
354 knowledge. Though Mr. Rogers loosely planned his PE lessons during the needs assessment  
355 phase, the weekly collaborative discussions between the PI and the two teachers provided  
356 opportunities to learn from each other (Hunzicker, 2011). Understanding teachers' individual  
357 dispositions towards PE and different physical activities, allowed the PI to further develop  
358 the activities the teachers felt most comfortable delivering, which were games and  
359 competitive activities (NCPE, 2008).

360 **Recognising the importance of PE.** The third sub-theme identified a positive shift in  
361 teachers' attitudes towards prioritising PE in the curriculum. Observations from the needs  
362 assessment phase identified many disruptions to PE lessons. Events outside the control of the  
363 class teachers, such as sports competitions, trips, and special assemblies took place that  
364 hindered PE lessons from proceeding as usual. The intermittent PE lessons in the rural school

365 continued from the start of November until the Christmas break “because pupils were on a  
366 trip to their secondary school” (PI, observation notes) and “because of practising for the  
367 Christmas concert” (PI, observation notes). Though this finding was a clear cause for  
368 concern, it was consistent with evidence from previous literature stating that PE lessons are  
369 cancelled more frequently than any other subject on the primary school curriculum  
370 (Hardman, 2010). Though disruptions were less prominent in the urban school, preparations  
371 for the Christmas fair, singing rehearsals for the Christmas concert, and general Christmas  
372 classroom tasks interfered with all lessons, but especially PE. For some pupils in these two  
373 schools, PE was the only structured physical activity they received all week (Bailey, 2000).  
374 As such, cancelling PE lessons, combined with rainy December South Wales weather (which  
375 meant indoor play-times) denoted high levels of physical inactivity and likely disruptions to  
376 pupils’ physical literacy development (Whitehead, 2010).

377         During the six-month physical literacy intervention, it was evident from observations  
378 that all teachers prioritised PE. Cancellations of PE lessons occurred less frequently, and  
379 teachers acknowledged in post-intervention interviews that they believed physical literacy  
380 was equally important to a child’s development as literacy and numeracy. These views were  
381 transferred to year six pupils during Mrs. Davies’ athletics lesson by saying: “Being healthy  
382 and active is just as important as being able to know your times tables” (observation note).  
383 During the weekly collaborative discussions, the PI continually emphasised the importance of  
384 physical activity as a means of developing the whole child, which was likely to have caused  
385 this shift in attitude.

386         Indeed, the collaborative discussions developed an awareness of teachers’  
387 responsibility in ensuring positive outcomes to pupils’ health in later life from quality PE  
388 provision was prominent: “That we [teachers] instill enthusiasm in children and they [pupils]  
389 realise the importance of staying healthy and doing physical activity at a young age so when



390 they become adults, there will be less problems with their health” (Mrs. Davies, post-  
391 intervention interview). This suggested that Mrs. Davies recognised the importance of  
392 developing pupils’ affective, cognitive, and social domains as well as their physical  
393 competence in order to influence their lifelong physical literacy development (Edwards et al.,  
394 2017; Keegan et al., 2019). This change was achieved by following the key principles of  
395 effective professional development and fostering a supportive environment tailored to the  
396 schools’ health and well-being strategies (Hunzicker, 2011; O’Sullivan, 2002).

### 397 **Operationalising Physical Literacy**

398 Four sub-themes evolved from the theme, *Operationalising Physical Literacy*. The  
399 first sub-theme, *transferring classroom practice into PE*, derived from 18 of the lesson  
400 observation notes, 11 of the collaborative reflection sessions, and three of the teacher  
401 interviews. Five examples have been selected to describe this sub-theme. The second sub-  
402 theme, *differentiating learning*, originated from 16 of the lesson observation notes, 22 of the  
403 collaborative reflection sessions, and three of the teacher interviews. Nine examples have  
404 been selected to describe this sub-theme. The third sub-theme, *ipsative assessment*, stemmed  
405 from 13 of the lesson observation notes, 11 of the collaborative reflection sessions, and three  
406 of the teacher interviews. Six examples have been selected to describe this sub-theme.  
407 Finally, the fourth sub-theme, *confidence in operationalising physical literacy*, was observed  
408 in four of the lesson observation notes, two of the collaborative reflection sessions, and three  
409 of the teacher interviews. Two examples have been selected to describe this sub-theme.

410 **Transferring classroom practice into PE.** Pedagogical and operational differences  
411 between the classroom and PE were observed during the needs assessment phase. Indeed,  
412 there were disparities between the planning procedures for classroom and PE lessons. Every  
413 classroom lesson was carefully planned on set templates that included learning objectives,  
414 starter tasks, main activities and plenaries in a progressive and differentiated manner,

415 whereas PE was not. In effect, Mrs. Davies and Mrs. Jones did not plan any PE lessons  
416 during the needs assessment phase, and though Mr. Rogers planned some PE lessons, his  
417 planning for PE was not carried out in the same rigorous manner as were his classroom  
418 lessons.

419         The lack of planning in PE lessons omitted crucial pedagogical elements. For  
420 example, there was a clear absence of learning objectives in PE lessons (Mrs. Davies and Mr.  
421 Rogers, observation notes). Such absence of learning objectives is considered problematic  
422 given that pupils were unlikely to fully understand the purpose of the PE lesson, what was  
423 expected of them, and what they should know/do by the end of the PE lesson (Paine, 2014).  
424 In contrast, classroom-based subjects had clear learning objectives, whereby pupils clearly  
425 understood the teachers' expectations (Capel, Leask, & Younie, 2016). Pupils would  
426 therefore benefit if this effective pedagogical stratagem from the classroom was transferred  
427 into the PE context.

428         To operationalise physical literacy and offering high-quality PE provision, good  
429 practice from the classroom was transferred into PE during the physical literacy intervention,  
430 as illustrated by the following reflection: "I made the comparison to the classroom, whereby  
431 the lesson always has a learning outcome and how imperative it was to share with pupils the  
432 aim of the lesson in PE and in the classroom" (PI, reflection). Indeed, this transfer of  
433 pedagogy was achieved through purposeful questions during the embedded collaborative  
434 discussions. This process encouraged teachers to reflect continually on the learning process  
435 and was embedded alongside their duties and responsibilities, aligning with the key principle  
436 of effective professional development (Hunzicker, 2011).

437         **Differentiated learning.** To ensure the professional development programme was  
438 instructional-focused to align with the key principles of effective professional development,

439 the PI ensured that pedagogical practices, such as differentiating (Hunzicker, 2011), were  
440 frequently discussed. During the three-month needs assessment phase, in both schools “tasks  
441 were not differentiated for pupils’ individual abilities” (PI, observation notes). Given that  
442 tasks should be varied and differentiated to maximise opportunities for self-referenced  
443 targets, the three teachers’ lack of differentiation was problematic in nurturing pupils’  
444 motivation (Vickerman, Walsh, & Money, 2015). It was observed that the higher physical  
445 ability learners became disengaged in PE due to boredom, and the lower ability learners  
446 became disengaged due to a lack of competence in completing the task, as illustrated in a PI  
447 observation note: “Pupils were engaged during the partner activity but when groups  
448 completed the task with cones, some pupils disengaged and started to misbehave; particularly  
449 the higher ability pupils.” This level of disengagement from the higher ability learners  
450 suggested the need for a change in teachers’ pedagogical practice while delivering PE to  
451 ensure tasks were challenging, yet realistic for each individual, and thereby aligning with the  
452 individualised element of the physical literacy journey (Vickerman et al., 2015; Whitehead,  
453 2010). With a high variance in abilities, and a high number of pupils with additional learning  
454 needs, particularly in the rural school, differentiating tasks for individual needs in PE was  
455 challenging for the teachers. That said, linking to the previous theme, all three teachers  
456 differentiated tasks in classroom lessons, for example, by providing “extra work sheets to the  
457 higher ability group for mathematics task” (PI, observation notes). Nonetheless,  
458 understanding the variance in abilities during the needs assessment phase offered the PI an  
459 insight into the daily challenges that teachers faced while trying to create positive, high-  
460 quality learning environments for their classes (Merrell & Tymms, 2012).

461           Given that the concept of physical literacy is individualised, differentiating tasks to  
462 meet individual needs was crucial in operationalising the complex and non-linear nature of

463 physical literacy. As such, differentiation was a core pedagogical topic during the weekly  
464 collaborative discussions:

465         The pedagogical focus of today’s discussion centred on differentiation again in  
466         cricket, so different challenges were placed, different balls and rackets would also be  
467         offered... for example in the quick cricket game there were different distances which  
468         equated to a point system (PI, reflection).

469         The differentiated tasks during the physical literacy intervention phase created a more  
470         inclusive environment, for example, pupils chose “their own level of ability on each station  
471         and create their own routine” during gymnastics, and “pupils chose the type of racket, ball  
472         and distance of the run” during cricket lessons (PI observation notes). At the start of the  
473         intervention phase Mrs. Davies believed differentiating in PE with year six pupils was  
474         challenging:

475         When the children are younger it's easier because they're all about the same in terms  
476         of physical development, but by the time they reach year six, you've got children  
477         playing cricket and rugby for the county, and others that, maybe except for PE  
478         lessons, they don't do anything physical outside of school (pre-intervention  
479         interview).

480         Indeed, as pupils enter the upper end of primary school, their ability to compare their own  
481         physical performance against peers becomes more sensitised and frequent (Welk & Eklund,  
482         2005). Offering pupils “different options to choose their own level” (PI, observation notes)  
483         created an inclusive environment placing emphasis on ipsative assessment.

484         **Ipsative assessment.** Where possible, judgements on performance should be made  
485         against a pupil’s previous attainment; it should be non-comparative, self-referenced, and  
486         ipsative assessment (Spengler & Cohen, 2015). It was observed that all teachers frequently

487 compared pupils' performances in PE by "the best performer" (PI, observation notes) which  
488 would likely be detrimental to pupils' attitudes toward PE and physical activity (Bannon,  
489 2013). In the needs assessment phase, all teachers employed assessment for learning  
490 strategies and praised pupils on effort and personal success during classroom lessons when  
491 circulating around the classroom and approaching the group tables (Whitehead & Almond,  
492 2013). Though pupils were aware of the higher and lower ability groups, performance  
493 comparison between pupils was not observed in the classroom. Research indicates that  
494 comparing pupils' academic performance would have negatively affected pupils' motivation,  
495 confidence, and self-esteem (Green, 2002). That said, it should be recognised that it is more  
496 difficult, logistically, to provide individualised feedback in PE lessons because pupils are  
497 physically more spread-out.

498         With these disparities between classroom and PE pedagogy, focusing on ipsative  
499 assessment was crucial in operationalising physical literacy throughout the intervention. The  
500 focus on ipsative assessment resulted in Mrs. Davies "praising pupils individually a lot more  
501 on their efforts" (PI, observation notes), and "encouraging pupils to try their best" during PE  
502 lessons (PI, observation notes). By the end of the project, all teachers demonstrated growth in  
503 recognising the importance of applying ipsative assessment strategies in PE. For example,  
504 Mrs. Davies stated, "it's not about winning or who's the best, it's about improving on what  
505 they have done in the past" (post-intervention interview). Indeed, as the intervention  
506 progressed, Mrs. Davies and Mrs. Jones ceased to create a comparative environment and  
507 incorporated the principles of ipsative assessment into their PE lessons. One athletics lesson  
508 prominently evidenced this change in practice: "Teacher promoted ipsative assessment by  
509 timing the number of laps pupils can achieve in five minutes and focusing on individual  
510 progress" (PI, observation notes). Despite the gains in implementing ipsative assessment in

511 PE lessons with all three teachers, Mrs. Jones expressed the need for ‘summative’  
512 assessments in PE to evidence progress:

513 For assessing in PE, we’ve tried to think about where pupils are individually and how  
514 much they’ve improved. We also now do more peer-evaluation methods which work  
515 very well in PE. Although these assessments are child-centred, I don’t think an  
516 inspector would see it as real evidence of assessment from us as teachers. (post-  
517 intervention interview)

518 Although Mrs. Jones appreciated the significance of assessing pupils against their personal  
519 best to improve their motivation and confidence in PE, in reality, the pressures of evidencing  
520 progress to align with governmental policies is pertinent. In turn, advocates should voice the  
521 inconsistencies between child-centred educational practices and governmental policies to  
522 policymakers. This important finding was uncovered because an emphasis in the present  
523 PDPL was placed on sustaining an ongoing relationship with teachers as opposed to one-off  
524 training (Atencio et al., 2012; Hunzicker, 2011).

525 **Confidence in operationalising physical literacy.** Overall, the collaborative weekly  
526 discussions from the physical literacy intervention increased teachers’ confidence in teaching  
527 PE and thus operationalising physical literacy. Mrs. Davies’s initial confidence levels to  
528 teach PE were low during the needs assessment phase: “... I don’t feel as confident to teach  
529 PE compared to other subjects” (pre-intervention interview). However, post-intervention  
530 statements depicted a contrasting outlook: “I am in my element teaching PE, and I know  
531 maybe the odd teacher, if they could get rid of one lesson, it would be PE, but not me. That is  
532 one lesson that will always stay” (post-intervention interview). This confirms a clear growth  
533 in confidence. This focus on teachers’ growth is rooted in the key principles of effective  
534 professional development whereby the PI nurtured the teachers as learners (Armour et al.,

535 2015). Acknowledgement that growth in learning is complex and individualised, hence can  
536 be exhibited in different ways was essential in the present study.

## 537 **Discussion**

538 A key feature of the present study was the observable impacts on teachers' knowledge  
539 and operationalisation of physical literacy after implementing the nine key principles of  
540 effective professional development. Flexibility was pertinent whilst conducting school-based  
541 research, as teachers have different levels of experiences and confidence while teaching PE,  
542 and as such, a 'one-size-fits-all model' does not suffice (Hunzicker, 2011). An important  
543 finding from the present study was the crucial role of including the three-month needs  
544 assessment phase to help facilitate the design of a successful six-month physical literacy  
545 intervention for both schools (O'Sullivan, 2002). During the needs assessment phase, the PI  
546 was able to acquire a greater understanding of the teachers' strengths and needs to develop  
547 their PE practice.

548 A finding that was consistent in both schools was that teachers did not naturally  
549 transfer well-recognised pedagogical and assessment practices from the classroom into the  
550 PE context. As a consequence, a crucial contributor to the perceived success of the present  
551 PDPL approach was the PI's observations of both classroom and PE practices in order to  
552 make fair judgements about the teachers' pedagogical capabilities and allow the transfer of  
553 positive classroom pedagogy to the PE setting. Some previous PE-CPD programmes have  
554 focused solely on observing teachers' PE pedagogy, and have omitted classroom pedagogy  
555 (Duncombe & Armour, 2003). Adopting this latter approach, however, would have limited  
556 the opportunities to develop teachers' overall professional practice.

557 Based on the differences in the three teachers' responses during the post-intervention  
558 interviews compared to the pre-intervention, the content of the physical literacy workshops

559 were experienced as effective in increasing teachers' understanding of the physical literacy  
560 definition. That said, the hour-long workshop was an introduction to the concept and did not  
561 permit time to explain how teachers can operationalise the key messages of physical literacy  
562 into practice. The impact of "one-shot," workshop-based, PE-CPD programmes have  
563 previously been criticised because teachers are less likely to apply the content once they  
564 "return to their daily routine" (Hunzicker, 2011, p.177). Sustainable changes to teachers'  
565 practices were achieved through embedding the principles of the physical literacy concept  
566 and high-quality PE. The embedded and dialogic nature of the professional development  
567 intervention did not overload the teachers with modifications to their practice, and therefore  
568 created sustainable changes (Holdsworth, Wyborn, Bekessy, & Thomas, 2008).

### 569 **Limitations**

570 That only two schools and only three teachers participated in the present study might  
571 have limited the study's potential impact. Nevertheless, having only two schools and three  
572 teachers did allow for an in-depth professional development that developed a sustainable  
573 change in teachers' practice.

### 574 **Conclusion**

575 To the authors' knowledge, this paper is the first to offer a programme focused on  
576 enhancing primary school teachers' knowledge and operationalisation of physical literacy.  
577 The principles adopted in the present study work in a complex primary school-based  
578 environment, hence can be applied in future professional development programmes. The  
579 present study exemplified the current pressing need to support primary school teachers to  
580 operationalise physical literacy through the delivery of high-quality PE lessons. Although the  
581 present professional development programme was delivered to year six (fifth grade) primary  
582 school teachers, its adaptability has been replicated in different contexts. For example, the



583 nine key principles of effective professional development have already been utilised recently  
584 in a Sport Wales funded ‘Physical Literacy Programme for Schools’ action research project,  
585 where the programme was adapted to working with year three teachers (7–8 year olds;  
586 Morgan, Bryant, Edwards, & Mitchell-Williams, 2018). Future research should consider  
587 following the nine key principles for effective professional development in other  
588 environments.

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